Exhibit 21

Regulations Requiring Manufacturers to Assess the Safety and Effectiveness of New Drugs and Biological Products in Pediatric Patients, *Final Rule*, 63 Fed. Reg. 66632 (Dec. 2, 1998)

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Parts 201, 312, 314, and 601

[Docket No. 97N–0165]

RIN 0910–AB20

Regulations Requiring Manufacturers to Assess the Safety and Effectiveness of New Drugs and Biological Products in Pediatric Patients

AGENCY: Food and Drug Administration, HHS.

ACTION: Final rule.

SUMMARY: The Food and Drug Administration (FDA) is issuing new regulations requiring pediatric studies of certain new and marketed drug and biological products. Most drugs and biologics have not been adequately tested in the pediatric subpopulation. As a result, product labeling frequently fails to provide directions for safe and effective use in pediatric patients. This rule will partially address the lack of pediatric use information by requiring that manufacturers of certain products provide sufficient data and information to support directions for pediatric use for the claimed indications.

DATES: *Effective date.* The regulation is effective April 1, 1999.

Compliance dates. Manufacturers must submit any required assessments of pediatric safety and effectiveness 20 months after the effective date of the rule, unless the assessments are waived or deferred by FDA.

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SUPPLEMENTARY INFORMATION:

I. Introduction

In the **Federal Register** of August 15, 1997 (62 FR 43900) (hereinafter referred to as the proposal), FDA proposed to require that manufacturers of certain new and marketed drugs and biologics conduct studies to provide adequate labeling for the use of these products in children. As described in the proposal, children are subject to many of the same diseases as adults, and are, by necessity, often treated with the same drugs and biological products as adults. However, many drugs and biological products marketed in the United States that are or could be used in children are inadequately labeled for use in pediatric patients or for use in specific pediatric subgroups (Refs. 1 and 2). Indeed, many of the drugs and biological products that are widely used in pediatric patients carry disclaimers stating that safety and effectiveness in pediatric patients have not been established (Refs. 2 and 3). Safety and effectiveness information for some pediatric age groups is particularly difficult to find. For example, there is almost no information on use in patients under 2 years of age for most drug classes (Ref. 1).

As described in more detail in the proposal, the absence of pediatric labeling information poses significant risks for children. Inadequate dosing information exposes pediatric patients to the risk of adverse reactions that could be avoided with an appropriate pediatric dose. The lack of pediatric safety information in product labeling exposes pediatric patients to the risk of age-specific adverse reactions unexpected from adult experience. The proposal cited reports of injuries and deaths in children resulting from use of drugs that had not been adequately tested in the pediatric population. The absence of pediatric testing and labeling may also expose pediatric patients to ineffective treatment through underdosing, or may deny pediatric patients therapeutic advances because physicians choose to prescribe existing, less effective medications in the face of insufficient pediatric information about a new medication. Failure to develop a pediatric formulation of a drug or biological product, where younger pediatric populations cannot take the adult formulation, may also deny pediatric patients access to important new therapies, or may require pediatric patients to take the drug in extemporaneous formulations that may be poorly or inconsistently bioavailable.

The proposed rule described previous steps taken by FDA in recent years to address the problem of inadequate pediatric testing and inadequate pediatric use information in drug and biological product labeling. FDA's Center for Drug Evaluation and Research (CDER) and Center for Biologics Evaluation and Research have implemented a ''Pediatric Plan'' designed to focus attention on, and encourage voluntary development of, pediatric data both during the drug development process and after marketing. In addition, in the **Federal Register** of December 13, 1994 (59 FR 64240) (hereinafter referred to as the 1994 rule), FDA issued a regulation requiring manufacturers of marketed drugs to survey existing data and determine whether those data were sufficient to support additional pediatric use information in the drug's labeling. Under the 1994 rule, if a manufacturer determines that existing data permit modification of the label's pediatric use information, the manufacturer must submit a supplemental new drug application (NDA) to FDA seeking approval of the labeling change.

Although the preamble to the 1994 rule recognizes FDA's authority to require drug and biological product manufacturers to conduct pediatric studies on a case-by-case basis, the rule does not impose a general requirement that manufacturers carry out studies when existing information is not sufficient to support pediatric use information. Instead, if there is insufficient information to support a pediatric indication or pediatric use statement, the rule requires the manufacturer to include in the product's labeling the statement: ''Safety and effectiveness in pediatric patients have not been established.''

The response to the 1994 rule has not substantially addressed the lack of adequate pediatric use information for marketed drugs and biological products. Pediatric labeling supplements were submitted for approximately 430 drugs and biologics, a small fraction of the thousands of prescription drug and biological products on the market. Of the supplements submitted, approximately 75 percent did not significantly improve pediatric use information. Over half of the total supplements submitted simply requested the addition of the statement ''Safety and effectiveness in pediatric patients have not been established.'' Others requested minor wording changes or submitted unorganized, unanalyzed collections of possibly relevant data. Approximately 15 percent (approximately 65) of the supplements provided adequate pediatric information for all relevant pediatric age groups, and another 8 percent (approximately 35) provided adequate pediatric information for some but not all relevant age groups.

The absence of adequate pediatric use information remains a problem for new drugs and biologics as well as for marketed products. The proposal presented data from 1988 through the 1990's showing that the percentage of new products entering the marketplace with adequate pediatric safety and effectiveness information has not increased in the last decade.

For example, FDA compared the number of new molecular entities (NME's) approved in 1991 and 1996

with potential usefulness in pediatric patients and looked at the adequacy of pediatric labeling for those drugs. Fifty-six percent (9/17) of the NME's approved in 1991 with potential usefulness in pediatric patients had some pediatric labeling at the time of approval. In 1996, only 37 percent (15/40) of the NME's with potential usefulness in pediatric patients had some pediatric labeling at the time of approval. For both 1991 and 1996, those drugs counted as having pediatric labeling may not have been studied in all age groups in which the drug was potentially useful. The manufacturers of an additional 7 of the 1991 drugs and 17 of the 1996 drugs promised to conduct pediatric studies after approval. Since publication of the proposal, figures for 1997 NME's have become available. In 1997, 39 NME's were approved. Twenty-seven had potential usefulness in pediatric patients, and 33 percent of these (9/27) had some pediatric labeling at the time of approval. Postapproval studies were requested or promised for an additional six. It is uncertain how many of the commitments made for postapproval studies of the 1996 and 1997 drugs will result in pediatric labeling. Of the seven NME's approved in 1991 for which sponsors made commitments to conduct postapproval pediatric studies, pediatric labeling has been added to only one. This figure reflects both studies that resulted in positive labeling, i.e., safety and dosing information, and studies that resulted in warnings against pediatric use. It does not reflect studies that failed to provide any useful information about pediatric use or studies that were completed but the sponsor failed to seek a change in its pediatric use labeling.

These data indicate that voluntary efforts have, thus far, not substantially increased the number of products entering the marketplace with adequate pediatric labeling. FDA has therefore concluded that additional steps are necessary to ensure the safety and effectiveness of drug and biological products for pediatric patients. This rule requires the manufacturers of new and marketed drugs and biological products to evaluate the safety and effectiveness of the products in pediatric patients, if the product is likely to be used in a substantial number of pediatric patients or would provide a meaningful therapeutic benefit to pediatric patients over existing treatments.

In addition to issuing this rule, FDA has initiated other actions that it hopes will encourage the development of adequate pediatric use information. FDA has issued a draft guidance document entitled ''General Considerations for Pediatric Pharmacokinetic Studies for Drugs and Biological Products'' (November 30, 1998). FDA also plans to develop additional guidance on how to develop effectiveness, safety, and dosing information to support pediatric labeling. The agency also supported a provision in the reauthorized Prescription Drug User Fee Act (PDUFA) eliminating user fees for pediatric supplements to encourage the submission of these supplements.

Finally, FDA has issued a guidance document entitled ''Providing Clinical Evidence of Effectiveness for Human Drug and Biological Products,'' describing the kinds of studies that can support effectiveness in supplemental or original applications. In that document, FDA provides guidance to manufacturers on the circumstances in which FDA may approve an initial or supplemental claim in which substantiation of the results of an adequate and well-controlled trial is provided by information other than a second adequate and well-controlled trial precisely replicating the first trial, or the circumstances in which studies without the extensive documentation ordinarily required could be utilized. This guidance will often be relevant to the data needed to support claims in a pediatric population.

Since the issuance of the proposal, Congress has enacted a bill that has an impact on pediatric studies of certain drugs. The Food and Drug Administration Modernization Act of 1997 (FDAMA) (Pub. L. 105–115) contains provisions that establish economic incentives for conducting pediatric studies on drugs for which exclusivity or patent protection is available under the Drug Price Competition and Patent Term Restoration Act (Pub. L. 98–417) and the Orphan Drug Act (Pub. L. 97–414). These provisions extend by 6 months any existing exclusivity or patent protection on a drug for which FDA has requested pediatric studies and the manufacturer has conducted such studies in accordance with the requirements of FDAMA. FDAMA also specifically recognizes FDA's intention to require pediatric studies by regulation and extends by 6 months any existing exclusivity or patent protection on a drug whose manufacturer submits pediatric studies in compliance with this rule, if the studies meet the completeness, timeliness, and other requirements of section 505A. Under FDAMA, a manufacturer who submits pediatric studies required under this rule may receive a 6-month extension of exclusivity or patent protection granted to the manufacturer for that drug.

Although FDA expects the exclusivity offered by FDAMA to provide a substantial incentive for sponsors to conduct some pediatric studies, the agency nonetheless believes that this final rule is necessary to significantly increase the number of drug and biological products that have adequate labeling. Certain limitations on the scope and effect of the exclusivity offered by FDAMA are likely to leave significant gaps in pediatric labeling. For example, because FDAMA exclusivity applies only to products that have exclusivity or patent protection under the Drug Price Competition and Patent Term Restoration Act and the Orphan Drug Act, it provides no incentive to conduct studies on certain categories of products, including most antibiotics, biologics, and off-patent products.

In addition, the voluntary nature of the incentive provided by FDAMA is likely to leave many drugs, age groups, and indications unstudied. Given limited resources to conduct pediatric studies, it is probable that manufacturers will elect to conduct pediatric studies preferentially on those drugs for which the incentives are most valuable, i.e., on drugs with the largest sales. This may leave unstudied drugs that are greatly needed to treat pediatric patients, but that have smaller markets. For similar reasons, manufacturers are less likely to seek FDAMA exclusivity by conducting studies on drugs that require studies in neonates, infants, or young children. The youngest pediatric populations are more difficult to study and may require pediatric formulations, making pediatric studies of these groups more expensive, thereby reducing the value of the incentives provided by FDAMA. Thus, where there is a great medical need for data on drugs with relatively small markets or for studies on neonates, infants, or young children, it may be necessary to require the collection of such data, rather than rely on incentives.

Finally, manufacturers are eligible for FDAMA exclusivity when they submit a study to FDA that is consistent with FDA's written request for such a study. The study results are not required to provide useful information on pediatric use (e.g., the results may be inconclusive), and the sponsor is not required to obtain approval of a supplement adding the information gained in the study to the drug's label. Thus, FDAMA provides no guarantee that the studies conducted under the statute will result in improved pediatric labeling.

For these reasons, FDA believes that there remains an important need for this rule. FDA has concluded, however, that with respect to already marketed drugs eligible for exclusivity under FDAMA, the publication of the list required by section 505A(b) and the availability of pediatric exclusivity may diminish the need to exercise the agency's authority to require studies. Under the rule, FDA has discretion whether to require studies of marketed drugs (see § 201.23 (21 CFR 201.23)). FDA believes that, in exercising its discretion under § 201.23, it is appropriate to determine whether manufacturers will undertake the needed studies voluntarily. FDA will therefore allow an adequate opportunity for manufacturers voluntarily to submit studies for drugs listed by FDA as having a high priority. If, following such an opportunity, there remain marketed drugs for which studies are needed and the compelling circumstances described in the rule are met, the agency will consider exercising its authority to require studies. With respect to marketed drugs and biologics that are not eligible for exclusivity under FDAMA, FDA intends to exercise its authority to require studies as of the effective date of the rule in the circumstances described in the regulation. FDA emphasizes that the appearance of a drug or biologic on the list published under section 505A(b) carries no implication that FDA will require studies on that drug or biologic under this rule. FDA intends to reserve its authority to require studies of marketed drugs and biologics to situations in which the compelling circumstances described in the regulation are present.

FDA intends to issue further regulations and guidance implementing the pediatric exclusivity provisions of FDAMA, which will, among other things, provide guidance on the interaction of this rule and FDAMA exclusivity.

II. Highlights of the Final Rule

This final rule is designed to ensure that new drugs and biological products contain adequate pediatric labeling for the approved indications at the time of, or soon after, approval. The final rule establishes a presumption that all new drugs and biologics will be studied in pediatric patients, but allows manufacturers to obtain a waiver of the requirement if the product does not represent a meaningful therapeutic benefit over existing treatments for pediatric patients and is not likely to be used in a substantial number of pediatric patients. The rule also authorizes FDA to require pediatric studies of those marketed drugs and biological products that: (1) Are used in a substantial number of pediatric patients for the claimed indications, and where the absence of adequate labeling could pose significant risks; or (2) would provide a meaningful therapeutic benefit over existing treatments for pediatric patients, and the absence of adequate labeling could pose significant risks to pediatric patients.

A. Scope of Rule

The proposed rule would have required an application for a drug classified as a ''new chemical entity'' or a new (never-before-approved) biological product to contain safety and effectiveness information on relevant pediatric age groups for the claimed indications. Based upon comments observing that changes in already marketed chemical entities, such as new indications or dosage forms, can have as much or more therapeutic significance for pediatric patients than the original product, the final rule expands the scope of the rule to include new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration for which an applicant seeks approval. The final rule does not, however, require the submission of pediatric data for a drug for an indication or indications for which orphan designation has been granted under section 526 of the Federal Food, Drug, and Cosmetic Act (the act) (21 U.S.C. 360bb).

B. Types of Studies Needed

As described in the 1994 final rule, gathering adequate data to establish pediatric safety and effectiveness may not require controlled clinical trials in pediatric patients. Where the course of the disease and the product's effects are similar in adults and pediatric patients, FDA may conclude that pediatric safety and effectiveness can be supported by effectiveness data in adults together with additional data, such as dosing, pharmacokinetic, and safety data in pediatric patients. The rule also does not necessarily require separate studies in pediatric patients. In appropriate cases, adequate data may be gathered by including pediatric patients as well as adults in the original studies conducted on the product.

The specific pediatric information needed in each case will depend on the nature of the application, what is already known about the product in pediatric populations, and the underlying disease or condition being treated. The final rule requires an assessment of safety and effectiveness in pediatric patients only for the indications claimed by the manufacturer. It does not require a manufacturer to study its product for unapproved or unclaimed indications, even if the product is widely used in pediatric patients for those indications. In the proposed rule, the pediatric study requirement for drugs was contained in § 314.50(g) (21 CFR 314.50(g)). In the final rule, the requirement is located in new § 314.55, because § 314.50 does not contain other specific study requirements. The location of the requirement for biological products (§ 601.27 (21 CFR 601.27)) remains unchanged in the final rule.

C. Age Groups

The final rule requires pediatric studies in each age group in which the drug or biological product will provide a meaningful therapeutic benefit or will be used in a substantial number of pediatric patients for the indications claimed by the manufacturer. The relevant age groups will, however, be defined flexibly, depending on the pharmacology of the drug or biological product, rather than following the fixed age categories defined in the 1994 rule and identified in the preamble to the proposed rule. For drugs and biological products that offer a meaningful therapeutic benefit, the rule requires manufacturers to develop pediatric formulations, if needed, for those age groups in which studies are required. Manufacturers may, however, avoid this requirement if they demonstrate that reasonable attempts to develop a pediatric formulation have failed.

D. Not-Yet-Approved Products

1. Deferral of Studies Until After Approval

The final rule permits the submission of pediatric information to be deferred until after approval if there is an adequate justification for deferral, e.g., because pediatric studies should not begin until some safety and/or effectiveness information on adults has been collected, or awaiting the completion of pediatric studies would delay the availability of a product to adults. When trials should begin in particular cases, and whether deferral will be necessary, will depend upon the seriousness of the disease for which the drug or biological product is indicated, the need for the product, the amount of safety and effectiveness data available, and what types of pediatric studies are needed.

In general, FDA expects that studies of drugs or biological products for diseases that are life threatening in pediatric patients and that lack adequate

therapy could begin earlier than studies of drugs that are less urgently needed, ordinarily as early as the availability of preliminary safety data in adults (frequently referred to as phase 1 data), even if data from well-controlled studies are not yet available. For less critical drugs and biologics, pediatric studies could ordinarily begin when additional safety and/or effectiveness data from the initial well-controlled trials in adults (frequently referred to as phase 2 data) became available. Of course, studies of products for exclusively pediatric diseases ordinarily need not await the development of adult data. The timing of individual pediatric studies will, however, necessarily depend on the specific information available about the product in question. For example, a study of a noncritical drug in adolescents might begin after the initial safety studies in adults, if all the parties involved agreed that initiation was appropriate in light of the results of the adult and animal safety studies.

In other cases, studies should not begin in pediatric patients until significantly more adult data are collected. For example, FDA does not believe that early study or use in pediatric patients is appropriate for some so-called ''me-too'' drugs that are expected to be widely used but are members of a drug class that already contains an adequate number of approved products with pediatric labeling. Such drugs may not have been shown to provide any benefit over other products in the same class, and may introduce new risks that are not apparent until the drug has been in wide use after marketing. Studies of such drugs will therefore usually be deferred until the safety profiles of the drugs are well established through marketing experience. To encourage use of properly labeled drugs in pediatric patients, FDA may require the pediatric use section of the approved labeling of such a me-too drug to contain a statement recommending preferential use of other drugs that are adequately labeled for pediatric use.

2. Waiver of the Study Requirement

The pediatric study requirement applies to all applications for new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration, unless FDA waives the requirement. Under criteria established in the rule, FDA may waive the study requirement for some or all pediatric age groups. The burden is on the sponsor to justify a waiver. A waiver will be granted if the waiver request demonstrates that the product meets both of the following conditions: (1) The product does not represent a meaningful therapeutic benefit for pediatric patients over existing treatments, and (2) the product is not likely to be used in a substantial number of pediatric patients. There was some confusion in the comments on the proposed rule over these waiver criteria. FDA emphasizes that the study requirement applies to a product that offers a meaningful therapeutic benefit even if it is not used in a substantial number of pediatric patients, and vice versa.

In response to comments, FDA has refined its definitions of ''meaningful therapeutic benefit'' and ''substantial number of pediatric patients.'' To define meaningful therapeutic benefit for both drugs and biologics covered by this rule, FDA has relied, in part, on CDER's current administrative definition of a ''Priority'' drug, applied to pediatric populations. The administrative definition of ''Priority'' products for biologics relies on different criteria (Ref. 2). Use of CDER's Priority drug definition to help define ''meaningful therapeutic benefit'' is not intended to affect the administrative definition of a Priority biologic. The Priority classification for drugs is determined based on CDER's estimate, at the time of NDA submission, of a drug's therapeutic, preventive, or diagnostic value. A Priority drug is defined as one that, if approved, would be a significant improvement in the treatment, diagnosis, or prevention of a disease, compared to marketed products approved for that use. In establishing meaningful therapeutic benefit for pediatric use, the comparison will be to other products adequately labeled for use in the relevant pediatric population. If there are no such products, a new product would usually be considered to have a meaningful therapeutic benefit. Improvement over existing products labeled for pediatric use can be demonstrated by, for example: (1) Evidence of increased effectiveness in treatment, prevention, or diagnosis of disease; (2) elimination or substantial reduction of a treatment-limiting drug reaction; (3) documented enhancement of patient compliance; or (4) evidence of safety and effectiveness in a new subpopulation. Evidence of improvement over existing therapies need not in all cases come from head-to-head trials.

To help ensure that pediatric patients have a sufficient range of treatments available, a product will also be considered to provide a meaningful therapeutic benefit if it is in a class of products or for an indication for which there is a need for additional therapeutic options, notwithstanding the fact that it might not be a priority drug. In contrast to the range of therapies for a given indication often available to adults, there are relatively few instances in which therapeutic alternatives are studied and labeled for pediatric patients. For some diseases, however, it is therapeutically important to have a range of available treatment options, e.g., because there are frequent treatment failures. The Priority definition would cover the first product labeled for pediatric use, but might not cover the second or third product for a given indication or in a given class, if the subsequent product did not offer an advantage over existing therapies. The specific number of products needed will depend upon such factors as the severity of the disease being treated and the adverse reaction profile of existing therapies. FDA will seek further guidance on applying this criterion from a panel of pediatric experts.

Thus, new products will meet the definition of a meaningful therapeutic benefit if: (1) They provide a significant improvement over existing adequately labeled therapies; or (2) if they are indicated for diseases or conditions, or are in product classes, in which there are currently few products labeled for pediatric use and more therapeutic options are needed. FDA expects that over time, as the number of products adequately labeled for pediatric patients grows, the number of new products meeting the second criterion will diminish. FDA emphasizes that the addition of the second criterion for defining meaningful therapeutic benefit under this final rule is not intended to alter the definition of a Priority drug, and that products meeting the second criterion will not thereby be eligible for Priority status. FDA also notes that the rule's definition of meaningful therapeutic benefit is intended to apply only in the pediatric study context.

FDA has also revised the proposed definition of ''a substantial number of pediatric patients.'' Many comments argued that the number chosen by FDA in the proposal (100,000 prescriptions per year or 100,000 pediatric patients with the disease) was arbitrary. Physician mention data from the IMS National Disease and Therapeutic Index (Ref. 38), which tracks the use of drugs by measuring the number of times physicians mention drugs during outpatient visits, shows that pediatric use of drugs is generally grouped in two distinct ranges. Physician mentions of drugs for pediatric use generally fall either below 15,000 per year or above 100,000 per year. Few drugs fall within the two ranges. Thus, selecting a cut-off

for ''substantial number of pediatric patients'' in the middle of the two ranges will provide a reasonable discrimination between products that are widely used and those that are less commonly used, and the specific number chosen will not arbitrarily include or exclude a significant number of drugs. FDA has therefore chosen 50,000 as the cut-off for a substantial number of pediatric patients. Because the number of pediatric patients with the disease or condition is easier to determine than the number of prescriptions per year, a substantial number of pediatric patients will be defined as 50,000 pediatric patients with the disease or condition for which the drug or biological product is indicated. Although physician mentions per year does not correspond exactly to the number of patients with the disease or condition, they provide a rough approximation and the IMS data show that the number of products included or excluded is relatively insensitive to changes in the cut-off chosen. As proposed, a partial waiver for a particular pediatric age group would be available under this method if 15,000 patients in that age group were affected by the disease or condition. This definition of ''a substantial number of pediatric patients'' has not been codified, however, and FDA may modify it, after consulting with a panel of pediatric experts. Any modification will be issued in a guidance document with an opportunity for comment.

FDA will also waive the pediatric study requirement where: (1) The applicant shows that the required studies on the product are impossible or highly impractical because, for example, the population is too small or geographically dispersed; (2) the product is likely to be unsafe or ineffective in pediatric patients; or (3) reasonable efforts to develop a pediatric formulation (if one is needed) have failed.

To reduce the burden on manufacturers in applying for waivers and deferrals, FDA intends to issue a guidance document providing a format for a request for waiver or deferral.

E. Marketed Products

The final rule is also intended to improve pediatric use information for already marketed drugs and biological products. The rule codifies FDA's authority, discussed in the 1994 rule, to require, in the compelling circumstances described in the regulation, that manufacturers of already marketed drugs and biological products conduct studies to support pediatric-use labeling for the claimed indications. The criteria for requiring studies of marketed products have been revised slightly in response to comments.

F. Early Discussions and Pre- and Postmarket Reports

The final rule contains provisions designed to encourage discussions of the need for pediatric studies early in the drug development process, as well as pre- and postmarketing reporting requirements designed to assist FDA in determining whether pediatric studies are needed for particular products and whether required studies are being carried out with due diligence.

G. Pediatric Committee

Many comments on the proposed rule urged FDA to form a committee of outside experts to assist in various aspects of the implementation of the rule. FDA has concluded that such a panel could provide useful advice and experience. FDA will convene a panel of pediatric experts, including at least one industry representative, and seek its advice on a range of issues related to implementation of the rule, including: (1) The agency's implementation of all aspects of the final rule, including its waiver and deferral decisions; (2) which marketed drugs and biological products meet the criteria for requiring studies; (3) when additional therapeutic options are needed for a given disease or condition occurring in pediatric patients; (4) ethical issues raised by clinical trials in pediatric patients; (5) the design of trials and analysis of data for specific products or classes of products; and (6) issues related to the progress of individual studies.

H. Remedies for Violation of the Rule

For violations of this rule, FDA would ordinarily expect to file an enforcement action for an injunction, asking a Federal court to find that the product is misbranded under section 502 of the act (21 U.S.C. 352) or is an unapproved new drug under section 505(a) of the act (21 U.S.C. 355) or an unlicensed biologic under section 351 of the Public Health Service Act, and to require the company to submit an assessment of pediatric safety and effectiveness for the product. Violation of the injunction would result in a contempt proceeding or such other penalties as the court ordered, e.g., fines. FDA does not intend, except possibly in rare circumstances, to disapprove or withdraw approval of a drug or biological product whose manufacturer violates requirements imposed under this rule.

III. Comments on the Proposed Rule

FDA received 54 written comments on the proposed rule from pediatricians, professional societies, parents, members of the pharmaceutical industry, organizations devoted to specific diseases, and patient groups. A significant majority of the comments, primarily those from pediatricians, professional societies, parents, organizations devoted to specific diseases, and patient groups, supported regulations requiring that drugs and biologics be studied in children. Many of these comments described the problems faced by the pediatric community and parents resulting from inadequate pediatric labeling and the absence of pediatric formulations, and argued that a pediatric study requirement was long overdue. Some comments, primarily those from the pharmaceutical industry, opposed a pediatric study requirement, arguing that existing voluntary measures and incentives were sufficient to ensure adequate pediatric labeling. Finally, a number of comments addressed FDA's legal authority to require pediatric testing of drugs and biologics.

FDA also held a day-long public hearing on October 27, 1997, in Washington, DC, at which recognized experts in the field, members of the pharmaceutical industry, and other interested parties were given an opportunity to discuss the issues raised by the proposed rule. There were three panels, each of which comprised representatives from industry, the pediatric community, organizations devoted to specific diseases, patient groups, and a bioethicist. The panels considered the following three issues: (1) When pediatric studies are needed, (2) what types of studies are needed, and (3) special challenges in testing pediatric patients. Those who spoke were nearly unanimous in their support for some kind of regulation requiring pediatric studies of some drugs and biologics. There was, however, a wide range of views on which drugs and biologics should be the subject of required studies and on how the requirement should be implemented.

Many written and oral comments raised specific issues for consideration by the agency. These comments are addressed below.

A. Purpose of Rule

1. FDA received many comments arguing that this rule is needed to ensure adequate medical care for children. Many comments from pediatricians stated that they regularly must prescribe to young children drugs

that are not labeled for children under 6 or even 12, and for which pediatric dosage forms do not exist. One comment stated that, without adequate testing and labeling, physicians must estimate appropriate pediatric doses, and that even at ''appropriate'' doses, it is not known whether use in children is as safe as use in adults. One comment argued that the absence of pediatric labeling puts children at greater risk for adverse drug reactions (ADR's) and therapeutic failures than adults. According to another comment, most common and severe ADR's in pediatric patients would be eliminated by adequate testing, and that perhaps 2 percent of all pediatric hospitalizations are due to ADR's. One comment concluded that the failure to conduct pediatric studies results in a different standard of care for children and adults in this country.

A comment from a pharmaceutical trade association argued, however, that most of the toxicity problems identified by FDA as caused by inadequate pediatric labeling were from the 1950's and that these ''dated'' examples are not relevant to current practice. As an example, the comment cited chloramphenicol, a drug referred to by FDA in the proposed rule because, when it was used in the 1950's in neonates without adequate testing, it was responsible for many infant deaths (Ref. 4). According to the comment, it is now known that chloramphenicol can be used in neonates if the dose is correct. The comment also stated that practicing physicians have access to adequate dosing information from case reports in the medical literature.

FDA agrees that the absence of adequate pediatric labeling puts pediatric patients at risk for adverse drug reactions and ineffective dosing. FDA believes that the reference to new dosing information that permits use of chloramphenicol in infants illustrates the need for this final rule. Had adequate safety and dosing information been available earlier, many babies' lives could have been saved. Instead, adequately supported dosing information was not available until after the drug had been used in a large number of babies, with tragic consequences. FDA also disagrees with the comment that the remaining reports cited in the proposal of unexpected toxicity in pediatric patients from inadequately tested drugs are ''dated.'' Contrary to the assertion in the comment, a majority of these reports are from the 1980's and 1990's (Refs. 5 through 14).

FDA also does not believe that case reports scattered through the medical literature are an adequate substitute for organized and complete pediatric labeling information. To the extent that published experience is informative and credible, it should be used to improve labeling. The comments received from pediatricians reflect their view that there is often no adequately supported dosing and safety information for the drugs they use routinely in their patients. Even where case reports are available, they describe a limited number of pediatric patients and cannot provide sufficient information to establish the safety profile of a drug in pediatric patients.

2. Some comments argued that pediatric studies are needed because differences between children and adults can make extrapolation from adult data treacherous. One comment pointed out that research on antiarrhythmics in pediatric patients has revealed many surprises in dosing and side effects. For example, drugs that bind to milk may cause safety or effectiveness problems in pediatric patients not detected in adults.

FDA agrees that pediatric dosing cannot necessarily be extrapolated from adult dosing information using an equivalence based either on weight milligram/kilogram (mg/kg) or body surface area (mg/m ^{2}). There are potentially significant differences in pharmacokinetics, or unique drug-food interactions, that may alter a drug's blood levels in pediatric patients. Moreover, there can be pharmacodynamic differences between adults and pediatric patients.

3. Several comments argued that voluntary measures have not resulted in a significant increase in pediatric labeling, and that new products continue to enter the market without adequate, or any, pediatric labeling. Pediatricians, professional societies, parents, organizations devoted to specific diseases, and patient groups provided many examples of diseases and drug classes for which pediatric labeling was long-delayed, inadequate, or nonexistent. Acquired immune deficiency syndrome (AIDS) drugs were frequently cited as an example of the industry's failure to obtain adequate pediatric labeling at or near the time of approval. One comment pointed to protease inhibitors, which are theoretically most effective in newborns but have not been tested or approved for use in this group. Even for older children, the comment observed that it has taken over a year after adult approval to obtain pediatric labeling for these life-saving drugs. Another comment stated that the absence of drugs for human immunodeficiency virus (HIV) infection that are appropriately labeled and formulated for pediatric patients causes parents to give children inappropriate doses, sometimes giving up part of their own dose if the child's physician will not prescribe it.

Other comments pointed out that epilepsy is considered a pediatric disease but claimed that many new epilepsy drugs are approved without information for use in pediatric patients. These comments urged that anti-epileptic drugs be added to the list of drug classes with inadequate labeling. A comment from a specialist in pulmonary medicine stated that although asthma is a common disease in pediatric patients, adult formulations are often released first, leaving pediatric patients without effective treatments. Other comments observed that not one of the standard immunosuppressive medications used in pediatric patients has been tested in pediatric patients. One comment contended that poor information about the pharmacokinetics of these drugs in pediatric patients has led to inadequate dosing to achieve effectiveness and possibly unnecessary toxicity.

The American Psychiatric Association commented that significant psychiatric diseases are increasingly diagnosed in pediatric patients, who may be treated with drugs despite the lack of pediatric labeling. According to this comment, most psychoactive medications are underutilized in pediatric patients due to the lack of pediatric labeling and to fear of overdosing. In the case of anti-hyperactivity drugs, however, the comment states that as many children are overtreated as undertreated, especially among pre-school age children. A comment from the National Institute of Mental Health (NIMH) stated that the rule was much needed to provide essential data on the safety and effectiveness of psychiatric medications in pediatric patients. This comment attached seven NIMH reviews of the existing data on psychotropic medications for pediatric patients, identifying many critical knowledge gaps that remain to be addressed by pediatric research.

One comment stated that pediatric nephrologists frequently prescribe drugs to pediatric patients for life-threatening conditions, including antihypertensive medications, diuretics, lipid-lowering agents, and immunosuppressive agents, even for pediatric patients less than 2 years of age, without benefit of formal studies. This comment further stated that drug therapy for chronic conditions like kidney failure is currently based only on experience gained from drug usage in children after approval for the indication in adults, and that

discovering ''inadequate dosing or severe side effects by empiric use of these drugs is not desirable or safe.'' Another comment provided the results of a survey of 4,898 pediatric patients with end-stage renal disease on the medications they receive. Ninety-seven percent received prednisone or prednisolone, 91 percent received cyclosporine, and 84 percent received azathioprine. According to the comment, none of these drugs was studied in pediatric patients and no information on the pharmacokinetics of these drugs in pediatric patients is available.

In contrast, several comments from the pharmaceutical industry argued that voluntary measures, the 1994 rule, and the incentives provided by FDAMA are adequate to assure adequate pediatric labeling and that FDA has not given these steps sufficient time to work. Several comments argued that to obtain pediatric studies, FDA should use encouragement and early discussion with sponsors, together with incentives, rather than imposing new requirements. These comments contended that sponsors should make ''phase 4 commitments'' (commitments to conduct pediatric studies after approval) and FDA should track these commitments. According to one comment, these methods have not been systematically used by FDA. According to another comment, FDA did not describe its present experience in getting manufacturers to conduct pediatric studies. Other comments argued that FDA has not allowed the 1994 rule sufficient time to produce results and that the agency should wait until it has reviewed and acted upon all supplements submitted under that rule before imposing new requirements. One comment contended that if the 1994 rule was successful in producing pediatric labeling for marketed drugs, the new rule should apply only to new drugs. One comment argued that incentives, including exclusivity, waiver of user fees, tax credits, and expedited reviews of pediatric supplements, and liability protection for research physicians, Institutional Review Boards (IRB's), universities, pharmaceutical firms, and parents, are the best means of obtaining pediatric labeling. A few comments argued that excessive litigation will follow imposition of this rule.

Two comments argued that the 53 NME's approved in 1996 demonstrate that pediatric labeling efforts by the industry are adequate, and that new requirements are not needed. Although the figures used in the 2 comments do not agree exactly, these comments stated that 20 or 21 of the 53 have potential for pediatric use. According to these comments, of these, 4 have approved pediatric labeling, 14 have planned or ongoing studies, 1 is switching to over-the-counter (OTC) use, and 1 or 2 have no immediate plans for pediatric labeling activities. One comment contended that, between 1990 and 1997, a 28 percent increase occurred in the number of new drugs in development for pediatric uses, but provided no data to support this claim.

FDA believes that the current state of pediatric labeling for drugs and biologics in the United States, as amply illustrated by comments from the pediatric community, is unsatisfactory. The agency's failure to obtain a significant increase in labeling for either new or marketed drugs or biologics through other measures implemented over the last several years demonstrates the need for a requirement that sponsors conduct pediatric studies of drugs and biologics that represent a meaningful therapeutic benefit to pediatric patients or that will be widely used in pediatric patients. As described in section I of this document, the response to the 1994 rule has not produced a significant improvement in pediatric labeling for marketed drugs. FDA received labeling supplements only for a small fraction of the drugs and biologics on the market. Of those supplements it did receive, over half of the submissions merely sought to add a statement to the product's labeling that ''safety and effectiveness in pediatric patients have not been demonstrated,'' and less than a quarter provided adequate pediatric information for some or all relevant age groups.

The agency's experience in attempting to obtain pediatric labeling for new drugs entering the marketplace through voluntary measures has also been disappointing. As described in the proposal, the percentage of NME's with adequate pediatric labeling has not increased since 1991, when the agency began systematic efforts to obtain better pediatric labeling. Although the number of requests by the agency and commitments by sponsors to conduct phase 4 (postapproval) pediatric studies may have increased, these requests and commitments have so far infrequently resulted in pediatric labeling. Table 1 of this document displays the results of commitments or requests to conduct pediatric studies postapproval between 1991 and 1996. FDA notes that the table does not reflect any labeling supplements under review. There are a total of six pediatric labeling supplements currently under review for NME's approved between 1991 and 1996. These supplements may or may not add significant new labeling information; but, in any case, would not substantially increase the number of successfully conducted postapproval studies.

TABLE 1.—PEDIATRIC LABELING

Status of pediatric labeling	1991	1992	1993	1994	1995	1996	Totals
NME's approved	30	25	25	22	28	53	183
Pediatric studies not needed	14	11	11	7	14	13	70
Label includes some pediatric use information or pediatric studies complete at time of approval	9	4	[1]5	[1]6	5	15	44
Postapproval pediatric studies promised or requested	7	10	[2]10	[2,3]10	[2]10	17	64
Pediatric labeling added after approval	1	0	2	4	2	2	11

[1] In one case, pediatric use information provided for one of two approved indications.
[2] In one case, pediatric data requested for second of two approved indications.
[3] In one case, pediatric data requested for additional age groups.

As Table 1 of this document reflects, FDA's figures disagree with those of the comments for the number of 1996 NME's with potential for pediatric use, the number with some pediatric labeling at the time of approval and the number for which commitments or requests for postapproval studies have been made. The comments did not identify specific drugs, so it is not possible to determine why the two sets of figures conflict. Nevertheless, the historical experience reflected in the table suggests that most of the postapproval pediatric studies for which commitments were made for the

1996 NME's will not result in pediatric labeling. Of the 17 commitments to conduct pediatric studies in 1996, there have thus far been only 2 additions of pediatric labeling. Although some additional studies supporting labeling changes may be submitted in the future, the experience reflected in Table 1 of this document suggests that this will not be a large number. For example, the 27 promised or requested studies for the 1991 through 1993 cohorts have resulted in just 3 additions of pediatric labeling 5 to 7 years after approval. Thus, FDA does not agree that the experience with 1996 NME's demonstrates the adequacy of current efforts to obtain pediatric labeling.

None of the comments claiming that the rule will result in excessive litigation provided any evidence suggesting a relationship between pediatric testing and increased litigation or liability. As shown in the number of NME's with pediatric labeling at the time of approval, a significant minority of drug and biologic manufacturers already conducts pediatric testing. FDA is aware of no evidence that excessive litigation has been associated with this testing.

With respect to the argument that the incentives provided by FDAMA will be sufficient to ensure adequate pediatric labeling, FDA believes that a mixture of incentives and requirements is most likely to result in real improvements in pediatric labeling. FDA is hopeful, e.g., that the FDAMA incentives will make more resources available for pediatric studies. As described earlier, FDA does not believe, however, that incentives alone will result in pediatric studies on some of the drugs and biologics where the need is greatest. The incentives provided by FDAMA are available only for drugs already covered by the exclusivity or patent protection provided by sections 505 and 526 of the act. Thus, the FDAMA incentives are not available for many already marketed drugs, or for many antibiotics or biologics. In addition, limited resources available to conduct pediatric studies and fiduciary obligations to shareholders may cause manufacturers to conduct pediatric studies preferentially on those drugs where the incentives are most valuable, rather than on those drugs or biological products where studies are most needed.

4. Two comments argued that the rule is inconsistent with a 1977 FDA document entitled ''General Considerations for the Clinical Evaluation of Drugs in Infants and Children,'' which recommended, among other things, that ''reasonable evidence of efficacy generally * * * be known before infants and children are exposed to [a drug].''

As described in more detail in section III.D of this document under ''Deferral,'' FDA expects that for drugs and biologics other than those for life-threatening diseases without adequate treatment, clinical trials in pediatric patients will ordinarily begin no earlier than when initial data from well-controlled trials in adults (frequently referred to as phase 2 data) become available to ensure that reasonable preliminary evidence of safety and/or effectiveness is available before pediatric patients are exposed to the drug or biological product. How much evidence of safety or effectiveness is ''reasonable evidence'' that should be available before pediatric trials may begin will be determined on a case-by-case basis. Thus, FDA believes that this rule is substantially consistent with the 1977 document.

FDA notes that the 1977 document was based upon a report prepared for FDA under a contract with the American Academy of Pediatrics (AAP). The AAP is currently developing proposed revisions to this document concerning the types of data needed to support pediatric labeling. The 1977 document, which falls under the general category of guidance documents, does not bind FDA or the public, but represents the agency's current thinking on a particular issue. Alternative approaches may be used if the alternative satisfies the requirements of the applicable statute and regulations (62 FR 8961, February 27, 1997) (Good Guidance Practices document). Until such time as an updated guidance on the clinical evaluation of drugs in infants and children is published, sponsors are encouraged to confer with the agency before initiating pediatric studies.

5. Several comments challenged FDA's use of the 1994 IMS National Disease and Therapeutic Index (NDTI) data on the 10 drugs used most frequently in pediatric patients without adequate labeling, arguing that the data incorrectly imply that physicians have no labeling information, when in fact prescribing information is now, or will be, available for most of the 10 drugs listed.

These comments misunderstand the purpose for which FDA cited the 1994 data. Those data provided a snapshot of the labeling information available to physicians for 10 widely used drugs at a given point in time. Even if additional information had been added to the labels of these drugs in the 4 years since the survey was conducted, there was none available during a year in which the drugs, together, were prescribed to pediatric patients over 5 million times. FDA notes, moreover, that, contrary to the suggestion in the comments, adequate labeling has been added for only 1 of the 10 drugs for the age group described in the proposal.

6. Two comments disputed the estimated number of times their products were prescribed to pediatric patients. One manufacturer argued that the total units sold of Auralgan were less than the listed number of prescriptions. Another manufacturer disputed the estimates of Ritalin usage. This manufacturer also complained that it was not contacted by FDA about use of Ritalin despite the statement in the proposal that FDA had contacted the manufacturers of the top 10 drugs used without adequate labeling in pediatric patients.

Limitations on the data used to estimate number of prescriptions may have resulted in the discrepancy noted by the manufacturers of Auralgan or Ritalin. The number of prescriptions is estimated from data provided by IMS America, Ltd. IMS NDTI surveys a sample of physicians (more than 2,940 physicians representing 27 specialities) to determine the number of times that, during patient contacts, physicians mentioned specific drugs for particular age groups. Physician mentions may not correlate exactly with actual usage. In addition, the NDTI numbers taken from the sample of physicians are extrapolated to the nation as a whole, using a given formula. With respect to the claim that FDA has not contacted the manufacturer of Ritalin, FDA notes that it has scheduled meetings with the manufacturer to discuss use of the drug in children, which have been canceled at the manufacturer's request.

7. One comment challenged FDA's use of quinolones as an example of a class of drug that does not need to be studied in pediatric patients. The comment claimed quinolones do need to be studied in pediatric patients because of their important use in cystic fibrosis patients.

FDA agrees that fluoroquinolones may provide important therapeutic benefits to patients with cystic fibrosis. At present, all approved fluoroquinolones are labeled with the following statement: ''Safety and effectiveness in children and adolescents less than 18 years of age have not been established.'' In addition, the label includes a statement advising that the fluoroquinolones cause arthropathy in juvenile animals. Historically, the agency has recognized a potential therapeutic role for the fluoroquinolones in children with cystic fibrosis and hematology/oncology

disorders. Indeed, FDA recently approved ciprofloxacin labeling containing a discussion of cystic fibrosis experience in the pediatric use subsection. These actions show that the agency recognizes that there may be a need to study fluoroquinolones in some pediatric patients.

8. One comment from a pharmaceutical company argued that serious ethical, legal, medical, and technical difficulties often prevent conducting pediatric studies. The comment cited difficulties in enrolling pediatric patients in sufficient numbers, unwillingness of parents to enroll children, and the absence of pediatric patients with the disease near convenient and qualified study centers. According to the comment, studies have been successfully conducted in pediatric patients in the past where there was a medical need for the drug in pediatric patients, but this rule will require pediatric studies of drugs intended for adults that may or may not be administered to pediatric patients. The comment also contended that the rule will necessitate a massive infusion of resources for industry, FDA, and medical speciality organizations, and that the agency should start with a small list of diseases with similar pathophysiology in adults and children, and a small list of drug classes known to have similar metabolism, and plan a graduated approach.

Contrary to the suggestion in the comment, this rule is designed to require studies only in those settings in which there is a significant medical need or where usage among pediatric patients is likely to be substantial. FDA acknowledges the difficulties encountered in some cases, but agrees that where there is a need for studies these difficulties have been overcome and that pediatric studies have been successfully conducted in many situations. FDA believes that the number of such studies already conducted each year, for example of antibiotics, vaccines, and roughly 25 percent of NME's, support the view that such studies are not medically, ethically, or technically impossible. FDA also emphasizes that this rule will not require studies in settings where ethical or medical concerns militate against studies. As with all studies regulated by FDA, no pediatric study may go forward without the approval of an IRB, which is responsible for ensuring that the study is ethical and adequately protects the safety of the subjects. In addition, the deferral provisions of the rule are specifically designed to ensure that no pediatric study begins until there are sufficient safety and effectiveness data to conclude that the study is ethically and medically appropriate.

B. Scope

The proposal would have covered only original applications for those drugs classified as ''new chemical entities,'' including antibiotics, and new biological products that had never been approved for any indication. A ''new chemical entity,'' defined in 21 CFR 314.108(a), is a drug that contains no previously approved active moiety. Under the proposal, chemical modifications that did not change the active moiety, such as the formation of a different salt or ester of the moiety, would not have required further study. New indications or dosage forms of a previously approved moiety also would not have required further studies. FDA sought comment on whether the requirement should apply more broadly, e.g., to applications for minor chemical variations of approved products, new indications, new dosage forms or new routes of administration.

9. A majority of those who commented on the scope of the rule recommended that the final rule cover all new drugs and biologics, including new dosage forms and indications, because modifications in existing drugs may be as therapeutically significant to pediatric patients as the original drug or biologic. These comments included pediatricians, medical societies, one pharmaceutical company, and one disease-specific organization. Several comments, including two companies, an IRB, the AAP, a disease-specific organization, and a professional society recommended including new indications and dosage forms on a case-by-case basis, generally if their inclusion were recommended by an expert panel. Several comments supported the narrow scope of the proposal, including a pharmaceutical trade association, a professional society, and several companies. The pharmaceutical trade association suggested that the rule might also apply to new formulations uniquely suited to pediatric patients.

FDA has reconsidered the scope of the rule in light of the comments and has concluded that, in some cases, the need for pediatric studies is as great for modifications of existing products and new claims as for the original products. A new indication or dosage form for a previously approved drug, e.g., could be far more relevant to pediatric patients than the originally approved product. From a public health standpoint, FDA cannot justify the distinction in the proposal between new chemical entities and never-before approved biologics, on one hand, and significant modifications of those products, on the other hand. Therefore, FDA has revised proposed §§ 314.55 (proposed 314.50(g)) and 601.27(a) to cover applications for new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration. The final rule exempts from its coverage any drug for an indication or indications for which orphan designation has been granted under the Orphan Drug Act (21 U.S.C. 360bb). FDA believes this exemption is appropriate because the purpose of the Orphan Drug Act is to encourage the development of drugs for patient populations that are so small as to make the manufacture and sale of the drug unprofitable if not for the incentives offered by the Orphan Drug Act. Imposition of a pediatric study requirement on an orphan drug could conflict with the balance struck by the Orphan Drug Act, by further raising the cost of marketing the drug. This exemption does not apply after marketing under § 201.23 of this final rule.

FDA's decision to expand the scope of the rule does not mean, however, that pediatric studies would always be needed for a new product entering the marketplace, or for a new claim. The waiver criteria will apply equally to modifications of existing drugs and biological products. Thus, FDA will require studies only of those new drugs and biologics that offer a meaningful therapeutic benefit to pediatric patients or that are expected to be used in a substantial number of pediatric patients. In many cases, moreover, new dosage forms might need relatively little pediatric data, such as pharmacokinetic data alone.

10. One comment sought clarification of the applicability of the rule to generic drugs. The comment argued that the collection of pediatric data was unwarranted where a generic manufacturer was copying a drug with an adult dose, and that FDA should require a pediatric bioequivalence study only where the innovator submits a supplement for a new dose or regimen in the pediatric population. Another comment from a generic drug trade association argued that bioequivalence studies in children should never be required to support approval of a generic drug.

This rule does not impose any requirements on studies submitted in support of applications for generic copies of approved drugs that meet the requirements of section 505(j) of the act. FDA also does not currently require bioequivalence studies to be conducted

in children for generic drugs. FDA notes that petitions submitted under section 505(j)(2)(C) for a change in active ingredient, dosage form, or route of administration may be denied if ''investigations must be conducted to show the safety and effectiveness of'' the change. Thus, if a petition is submitted for a change that would require a pediatric study under this rule, the petition may be denied.

C. Required Studies

FDA proposed to amend its regulations related to the content of NDA and biologic license applications (BLA's) to include required information on pediatric studies for certain applications. Under the proposal, an application for a new chemical entity or never before approved biologic would have been required to contain data adequate to assess the safety and effectiveness of the product for all pediatric age groups for the claimed indications, unless FDA granted a deferral or full or partial waiver of the requirement. As described in section III.B of this document under ''Scope'', FDA has revised § 314.55(a) (proposed § 314.50(g)(1)) and § 601.27(a)) to cover applications for new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration. Under the final rule, all covered applications will be required to contain data adequate to assess the safety and effectiveness of the product, unless FDA has granted a waiver or deferral of the requirement (see ''Waiver'' and ''Deferred Submission'' in section III.D and E of this document).

Assessments required under this section for a product that represents a meaningful therapeutic benefit over existing treatments must be carried out using appropriate formulations for the age group(s) for which the assessment is required, unless reasonable efforts to produce a pediatric formulation had failed (see ''Waiver'' in section III.E of this document). Comments on issues related to formulation are addressed under ''Pediatric Formulations'' in section III.I of this document.

The proposal did not mandate particular types of studies. The proposal recommended that the sponsor consult with FDA on the types of data that would be considered adequate to assess pediatric safety and effectiveness in particular cases.

FDA received several comments on the design and conduct of clinical trials in pediatric patients.

11. One comment asked for clarification of what is meant by ''adequate evidence'' to demonstrate safety and effectiveness. The comment argued that FDA should not require two adequate and well-controlled trials for pediatric studies, and that the amount of evidence required should depend on the ability of the data to be extrapolated from adult to pediatric patients, the seriousness of the illness to be treated, the ability to assess meaningful measures of efficacy in pediatric patients, and the feasibility of conducting adequate trials in relatively uncommon pediatric disease states. Another comment claimed that the ability to extrapolate from adult efficacy data is limited and argued that well-controlled trials in pediatric patients should be the norm. This comment also stated that safety cannot be extrapolated from adult data and recommended studying 300 pediatric patients for an adequate period to identify frequent ADR's. Other comments questioned the appropriateness of extrapolating from adult effectiveness data in a variety of settings. One comment argued that in the area of blood products, in addition to extrapolating from pharmacokinetic data, it may be appropriate to extrapolate from adult data using relative blood volume replacement. Several comments urged reliance on a variety of other sources of data, including published studies and reports, and actual use information. One comment urged FDA to rely on advanced scientific and statistical methods that optimize safety, convenience, and informativeness, while minimizing unnecessary or uninformative clinical trials.

FDA agrees that ''adequate evidence'' of safety and effectiveness for pediatric patients does not necessarily require two adequate and well-controlled trials. One of two central purposes of the 1994 rule was to make it clear that pediatric effectiveness may, in appropriate circumstances, be based on adequate and well-controlled studies in adults with supporting data in pediatric patients that permit extrapolation from the adult data. FDA agrees, however, that extrapolation from adult effectiveness data would not always be appropriate and that it may not be appropriate to extrapolate pediatric safety from adult safety data. FDA has specifically noted, in the FDA guidance document entitled ''Providing Clinical Evidence of Effectiveness for Human Drug and Biological Products,'' that if further controlled trial data were needed in a population subset, it would usually be sufficient to conduct a single additional controlled trial. FDA also agrees that useful information can come from data other than adequate and well-controlled trials, and encourages the submission of valid and reliable data from a variety of sources. The type and amount of data required in any particular case will depend upon many factors, including those cited in the comments.

12. One comment urged FDA, in the final rule, to encourage sponsors to use Computer-Assisted Trial Design (CATD), allowing them to reduce number of actual trials in pediatric patients.

FDA encourages the use of any validated scientific method for designing, conducting, or analyzing clinical trials.

13. One comment questioned whether there will be a sufficient pool of pediatric subjects to complete trials, in light of the increase in the number of trials occasioned by the rule.

FDA believes that with appropriate organization, the pool of pediatric patients available for studies should be adequate. The Pediatric Pharmacology Research Units (PPRU's), a network of groups instituted to conduct pediatric research, some of which are located outside of major population centers, have an established record of recruiting pediatric patients and completing valid studies. Even where the number of pediatric patients affected by a disease is small, valid studies have sometimes been successfully conducted. It should also be reemphasized that many of the studies contemplated under the rule are pharmacokinetic studies, dose-response studies with short-term endpoints (pharmacodynamic studies) and safety studies that are likely to impose relatively little burden on individual patients. Where, however, patient recruitment is so difficult as to make the study impossible or highly impractical, the rule permits a waiver of the study requirement (§§ 314.55(c) and 601.27(c)).

14. One comment urged that the final rule include a broader research requirement, and sought to have drug interactions and drug metabolism taken into consideration. Another comment sought to have the final rule codify minimal requirements for studies, such as toxic overdose and pharmacokinetic data. One comment urged FDA not to codify specific requirements for clinical trials, but to establish these requirements in consultation with an expert pediatric committee.

FDA declines to codify specific requirements for pediatric studies. Flexibility is necessary to assure that required studies are appropriate for each product. FDA will, however, consult with a pediatric committee on specific pediatric study issues.

15. One comment from a professional pharmacy organization urged that all protocols for pediatric studies be reviewed by pediatric experts, including a pharmacist knowledgeable about pharmacodynamic factors in each age group.

FDA reviews protocols for pediatric studies submitted in investigational new drug applications (IND's), and its reviewers include experts in pediatrics and pharmacology.

D. Deferred Submission

The proposal recognized that there would be circumstances in which it would be appropriate to permit the submission of pediatric data after approval. Two such circumstances were described in the preamble to the proposal: (1) Where adult safety or effectiveness data need to be collected before the product could be appropriately studied in pediatric patients, and (2) where the product was ready for approval in adults before studies in pediatric patients were completed. Although not included in the text of the proposal, these examples have been added to the final rule. Under the proposal, FDA would have the authority to defer the submission of some or all of the required pediatric data until after approval of the product for adult use, on its own initiative or at the request of the applicant. Under the proposed provisions, if the applicant requested deferral, the request would be required to contain an adequate justification for delaying pediatric studies. If FDA concluded that there were adequate justification for deferring the submission of pediatric use studies, the agency could approve the product for use in adults subject to a requirement that the applicant submit the required pediatric studies within a specified time after approval. It is important to appreciate that deferred submission of pediatric data refers to the date on which the data are submitted, not when the studies are initiated. Thus, deferred studies will generally be initiated before approval, unless it is concluded that the full adult data base or marketing experience are needed before pediatric studies may appropriately begin.

FDA stated in the proposal that it would consult with the sponsor in determining a deadline for the deferred submission, but tentatively concluded that it would require the submission not more than 2 years after the date of the initial approval. To ensure that deferral would not unnecessarily delay the submission of pediatric use information, FDA proposed that a request for deferred submission include a description of the planned or ongoing pediatric studies, and evidence that the studies were being, or would be, conducted: (1) With due diligence, and (2) at the earliest possible time. FDA sought comment on the circumstances in which FDA should permit deferral, and on the factors that should be considered in determining whether a given product was one that should be studied in adults before pediatric patients. FDA received many comments on the deferral provisions in the proposal.

16. A few comments stated that the deferral provisions are an appropriate means of assuring that pediatric patients are not studied before adequate safety data have been gathered. A number of comments from the pharmaceutical industry asserted, however, that the proposal would require concurrent testing in adults and pediatric patients despite medical and ethical reasons for delaying testing pediatric testing. For example, a comment from a pharmaceutical trade association claimed that the rule:

> * * * would require testing of new medical compounds in children before safety in adults has been studied adequately, before effectiveness in adults has been established, and in young children and neonates without adequate information about the effects of the drug in older pediatric patients.

These industry comments appear to have misunderstood the explicit deferral provisions of the rule and perceived them as rare exceptions to a usual requirement that adults and children be studied at the same time. Nothing in the rule requires concurrent testing in adults and pediatric patients, nor testing in infants and neonates before testing in older children. As stated previously and in the proposal, the deferral provisions were specifically included to, among other things, ensure that pediatric studies could be delayed when necessary to assure that appropriate safety and/or effectiveness data were available to support pediatric testing.

17. Most of the comments on deferral focused on whether the need for safety and/or effectiveness data in adults before initiating pediatric studies should be a basis for deferral. Comments from disease-specific organizations, medical societies, including the AAP, and pediatricians argued that deferrals should be granted rarely if at all on this basis. One comment argued that delaying availability of life-saving drugs to children cannot be rationalized scientifically, legally, or ethically, and contended that deferral should not be permitted for serious and life-threatening diseases where there is no substantial difference between the disease or the anticipated effect of the drug in children or adults. Another comment argued that deferral should be used sparingly in all age groups, including infants and neonates, and that its use should be evaluated in the context of the seriousness of the condition to be treated, the therapeutic advance the drug represents, and the likelihood that the drug will be given to children as soon as it is approved. According to this comment, the risks of research in pediatric patients may be outweighed by the risks that the drug will be given to them without data.

One comment argued that pediatric studies of important drugs should be conducted in parallel to adult studies, especially in children under 12. Several comments from the pediatric community, however, supported the development of some adult safety and/or effectiveness data before initiation of pediatric studies. One comment from an organization devoted to pediatric AIDS stated that while the general assumption should be that pediatric studies will be submitted at the same time as adult studies, it may be appropriate to have some testing in adults before children. The AAP stated that it is appropriate to begin studies in pediatric patients after phase 1 and phase 2 studies in adults have defined routes of clearance and metabolic pathways. Thus, the comment urged that pediatric studies be conducted during phases 2 and 3, not 4. A comment from a nephrology organization argued that drugs for organ-specific diseases should be studied in phase 3, as soon as phase 1 and 2 trials have shown safety in adults. This and another comment stated that deferring studies until after approval compromises clinical trial enrollment, citing the experience with recombinant erythropoietin. According to these comments, erythropoietin was not studied in pediatric patients until after its approval for adults, and enrollment was so difficult that pediatric studies were not completed for 5 years.

Several comments from the pediatric community also cited limited circumstances in which they believed deferral to be appropriate. A medical society argued that data should be collected after adult studies only for drugs with narrow therapeutic indices, unusual accumulation in the body, where the drug study requires extensive blood sampling, or where the study design places young patients at risk for limited information gain.

Many comments from the pharmaceutical industry argued, in contrast, that deferral should be the

rule, rather than the exception. Most of these comments contended that it was unethical to begin studying drugs in pediatric patients, other than those that are intended primarily for pediatric patients, until the drugs are shown to be reasonably safe and effective in adult patients. All argued that pediatric studies must not be initiated until substantial data in adults are available, but cited different initiation points, e.g., after phase 2, after safety and effectiveness is established in adults and an approvable letter is received, after approval, after 1 year of marketing.

Although many of these industry comments argued that pediatric studies should be conducted exclusively as phase 4 (postapproval) commitments, a significant number of industry comments acknowledged that pediatric studies could begin before approval, generally after phase 2, and that there were circumstances in which deferral was not appropriate. One comment argued that because early pediatric studies often require pediatric formulations and because up to 50 percent of drugs are abandoned before phase 3, it is wasteful to require companies to manufacture a pediatric formulation and begin studies before the end of phase 2. Another comment argued that no pediatric studies should begin before the decision to proceed to phase 3, except where: (1) The disease affects only pediatric patients; (2) the disease mainly affects pediatric patients, or the natural history or severity of the disease is different in pediatric patients and adults; or (3) the disease affects both pediatric patients and adults and lacks adequate treatment options. One comment urged that the final rule state that ''in most cases, pediatric testing should not begin with any drug or biological product until certain adult safety and/or effectiveness information has been collected.'' According to this comment, there could be exceptions where no other therapy was available and there was a potential for the drug to be lifesaving. A pharmaceutical trade association argued for a presumption that pediatric studies not begin until the end of phase 2 or 3, but listed circumstances in which deferral should not occur: (1) Where the disease is life threatening and there is no alternative therapy, (2) where the drug is intended for a pediatric indication, (3) where the drug presents no major safety issues, (4) where the drug class is well studied in pediatric patients, or (5) where a large amount of ''off-label'' use in pediatric patients is anticipated.

In general, FDA expects that some data on adults will be available before pediatric studies begin, but that less data will usually be required to initiate studies of drugs and biologics for life-threatening diseases without adequate treatment than for less serious diseases. Pediatric studies of drugs and biologics for life-threatening diseases may in some cases be appropriately begun as early as the initial safety data in adults become available, because the urgency of the need for such products may justify early trials despite the relative lack of safety and effectiveness information. In such cases, deferral of submission of pediatric studies until after approval will be unnecessary, unless drug development is unusually rapid and the product is ready for approval in adults before completion of the pediatric studies.

Pediatric studies on products for less serious diseases should generally not begin until more adult data have been collected, ordinarily no earlier than the availability of data from the initial well-controlled studies in adults. As noted earlier in this document, there may occasionally be exceptions to this principle where all parties agree that earlier initiation is appropriate. Whether deferral of submission of the data until after approval will be necessary for such products will depend upon when pediatric studies can scientifically and ethically begin in each case and how difficult the studies are to complete.

In some cases, FDA expects that scientific and ethical considerations will dictate that studies not begin until after approval of the drug or biological product. For example, pediatric studies of ''me-too'' drugs that do not offer a meaningful therapeutic benefit and that are members of a drug class that already contains an adequate number of approved products with pediatric labeling may be deferred until well after approval. In cases where a drug has not been shown to have any benefit over other adequately labeled drugs in the class, the therapeutic need is likely to be low and the risks of exposing pediatric patients to the new product may not be justified until its safety profile is well established in adults through marketing experience. Because the basis for the deferral in such cases will be concern that the drug presents risks to pediatric patients that will not be known until there is widespread marketing experience, without offsetting benefit, FDA may require, in appropriate cases, that such drugs carry labeling statements recommending preferential use in pediatric patients of products that are already adequately labeled. Such a statement might read:

> The safety and effectiveness of this product have not been established in children. There are alternative therapies that have been shown to be safe and effective for use in children with [indicated condition]. Ordinarily, products already labeled for use in children should be used in preference to [name of this product].

FDA labeling regulations at 21 CFR 201.57 express the agency's authority to ensure that drugs are safe for use under the conditions prescribed, recommended, or suggested in their labeling, and to require labeling identifying safety considerations that limit the use of drugs to certain situations. Some drugs with no demonstrated advantage over available therapy can nonetheless be expected to have wide use in pediatric patients. Pediatric studies of such drugs should be initiated relatively early, even if they are not completed at the time of approval.

18. A comment from a pharmaceutical company listed several circumstances in which it argued FDA should permit deferral: (1) The pediatric population is so small that enrollment and completion of trials cannot be accomplished in parallel with adult trials, (2) the natural course of the disease is different in adults and children, (3) analytic tools and clinical methodologies cannot be easily adapted to the pediatric population, (4) the drug has complex pharmacokinetic properties in adults making it hard to extrapolate a pediatric dosage range, (5) the scope and nature of nonclinical studies support only adult clinical studies, (6) two or more attempts to develop a pediatric formulation have failed, or (7) unique drug-drug or drug-food interactions in children confound drug development. Another comment added to this list: (1) Where fewer than 200,000 pediatric patients are affected by the disease being treated, and (2) drugs with a low therapeutic index.

FDA agrees that some of these circumstances could make completion of studies prior to approval in adults difficult, but does not agree that they would make studies impossible or impractical in all cases. The need for deferral must be considered case-by-case. A small pediatric population, e.g., might make completion of controlled trials very slow, but might not prevent obtaining pharmacokinetic data. Simply citing a pediatric population under 200,000 will not be sufficient to justify deferral; a small fraction of this number participating in trials may be sufficient to support timely pediatric studies, depending on the nature of the studies. As an example, over 70 percent of the estimated 6,000 pediatric patients with cancer each year are enrolled in clinical trials (Ref. 15). There does not seem to

be any reason to conclude that deferral is warranted solely because the natural course of the disease is different in adults and children. FDA also disagrees that deferral is necessarily warranted where analytic tools and clinical methodologies cannot be easily adapted to pediatric patients. Deferral may be necessary in some cases where the infants and toddlers are unable to provide subjective outcome data, but it may also be possible to utilize alternative endpoints or to extrapolate effectiveness data from older pediatric age groups, obtaining pharmacokinetic data from the younger age groups to determine an appropriate dose. Drugs with a low therapeutic index that do not fulfill an urgent need should, in general, be studied in pediatric patients later in drug development.

With respect to complex pharmacokinetic properties that prevent extrapolation of adult data to pediatric patients, low-therapeutic index drugs, and unique drug-drug or drug-food interactions in pediatric patients, FDA believes that the need for pediatric studies before approval is even greater where these conditions are present; moreover, none of them represents a significant impediment to studies. Recognizing that drugs and biologics approved for adults are regularly prescribed to pediatric patients despite the absence of adequate dosing and safety data, information positively suggesting that dosing and safety cannot be extrapolated from adult data increases the importance of conducting pediatric studies before the product is widely used in pediatric patients. The absence of supporting nonclinical studies (e.g., studies in young animals) should not usually be a basis for deferral. These studies, if needed, are readily conducted. Moreover, a full adult data base provides pertinent safety information that might make further preclinical data unnecessary. Difficulties in developing an adequate pediatric formulation may, in some cases, justify deferral of studies in young pediatric patients. In other cases, however, it may be appropriate to study a less-than-optimal formulation, e.g., an injection, if one is available, in pediatric patients while awaiting the development of a more desirable pediatric formulation.

19. One comment argued that it was ''unacceptable'' to defer pediatric studies to avoid delaying approval for adult use. Instead, the comment urged FDA to provide a ''limited approval'' for adult use until pediatric data are available and impose a monetary penalty for failure to comply. Another comment argued that permitting deferral to avoid delay in adult marketing could be applied to most applications, creating a de facto situation in which pediatric data were understood to be not required until 2 years after approval. One comment stated that while pediatric dosing schedules are essential, pediatric studies should not delay approval of drugs for a major population, adults.

FDA continues to believe that deferral is appropriate where awaiting the completion of pediatric studies would delay the availability of a safe and effective drug or biological product for adults. Granting a deferral does not automatically mean, however, that pediatric studies need not be submitted for 2 years or that initiating them should be long delayed. The proposal suggested 2 years as the maximum period for a deferral. Where pediatric studies are supposed to be nearing completion at the time a product is ready for approval in adults, FDA expects that the period of deferral would be significantly shorter than 2 years. Where some useful pediatric information, e.g., safety information, is available at the time of approval, even if some required studies are not complete, FDA may require that the pediatric use section of the product's labeling include that information, to the extent consistent with 21 CFR 201.57(f)(9). FDA also notes that it has no authority to impose a monetary penalty for failure to submit a required study of a drug or biological product. FDA must ask a court to impose such a penalty in a contempt proceeding.

20. Several comments argued that pediatric trials should be conducted sequentially, beginning with the oldest pediatric age group, and ending with the youngest. One comment stated that IRB's would question testing a drug in younger children before older children. The AAP argued that there is little defense for studying pediatric patients sequentially from oldest to youngest, and that such a policy will result in approvals without data in neonates. This comment argued that the timing of studies should give consideration to safety, but without consideration of sequence. Another comment argued that FDA should not routinely require that drugs for serious and life-threatening diseases be studied sequentially. In HIV, according to this comment, drug testing should be ''as simultaneous as possible'' because safety and dosing may be initiated in each age group in a dose escalating manner regardless of the results in previously tested groups.

FDA agrees that age-dependent sequential studies are not necessarily appropriate. Particularly were there is urgent need for a product, there may be good reason to study older and younger children at the same time.

21. A few comments objected to FDA's tentative decision to require the submission of studies ordinarily no later than 2 years after the initial approval. One comment stated that deferral of up to 2 years was excessive, citing the ''critical'' need to ensure timely performance of pediatric studies in populations where the drug is likely to be used. Another comment stated that 2 years may be adequate for collecting pharmacokinetic data, but not necessarily for collecting safety data. According to this comment, the size of the clinical data base will be the principal determinant of when data should be submitted. A comment from the American Red Cross stated that the extensive IRB review of studies of blood products involving pediatric patients, and the difficulty in enrolling such patients, makes the 2-year deferral deadline unrealistic for this category of product.

FDA agrees with the comments that the 2-year deadline suggested by the proposal may not be appropriate, and that the length of the deferral should be decided on a case-by-case basis. The timing of the deferred submission will depend upon such factors as the need for the drug or biologic in pediatric patients, when sufficient safety data become available to initiate pediatric trials, the nature and extent of pediatric data required to support pediatric labeling, and substantiated difficulties encountered in enrolling patients and in developing pediatric formulations. FDA may also extend the date for submission of studies at the time of approval, e.g., where other drugs in the class have been approved during the pendency of the NDA and the new drug is no longer needed as a therapeutic option.

E. Waivers

FDA does not intend to require pediatric assessments unless the product represents a meaningful therapeutic benefit over existing treatments or is expected to be used in a substantial number of pediatric patients. FDA also does not intend to require pediatric assessments in other situations where the study or studies necessary to carry out the assessment are impossible or highly impractical or would pose undue risks to pediatric patients. Thus, FDA proposed to add § 314.50(g)(3) (now § 314.55(c)) and § 601.27(c) to authorize FDA to grant a waiver of the pediatric study requirement on its own initiative or at the request of the applicant unless the product represented a meaningful therapeutic benefit over existing

treatments, or was likely to be used in a substantial number of pediatric patients. These provisions also require FDA to grant a waiver if necessary studies were impossible or highly impractical, because, e.g., the number of pediatric patients was very small or patients were geographically dispersed, or there was evidence strongly suggesting that the product would be ineffective or unsafe in some or all pediatric populations. If a waiver were granted because there was evidence that the product would be ineffective or unsafe in pediatric patients, this information would be included in the product's labeling.

An applicant could request a full waiver of all pediatric studies if one or more of the grounds for waiver applied to the pediatric population as a whole. A partial waiver permitting the applicant to avoid studies in particular pediatric age groups could be requested if one or more of the grounds for waiver applied to one or more pediatric age groups. In addition to the other grounds for waiver, the proposal would authorize FDA to grant a partial waiver for those age groups for which a pediatric formulation was required (see ''Pediatric Formulations'' in section III.I of this document), if reasonable attempts to produce a pediatric formulation had failed.

The proposal would require the applicant to include in the request for a waiver an adequate justification for not providing pediatric use information for one or more pediatric populations.

FDA would grant the waiver request if the agency found that there was a reasonable basis on which to conclude that any of the grounds for a waiver had been met. If a waiver were granted on the ground that it was not possible to develop a pediatric formulation, the waiver would cover only those pediatric age groups requiring a pediatric formulation.

The agency also proposed two possible methods of determining a ''substantial number of patients.'' The first method would focus on the number of times the drug or biologic was expected to be used in pediatric patients, annually. Under this method, FDA tentatively concluded that 100,000 or more prescriptions or uses per year in all pediatric age groups would be considered a substantial number.

The second proposed method for establishing whether there was a substantial number of pediatric patients would focus on the number of pediatric patients affected by the disease or condition for which the product is intended. Under this method, FDA tentatively concluded that 100,000 pediatric patients affected by the disease or condition for which a product was indicated would be considered a ''substantial number'' of pediatric patients. FDA sought comment on the waiver criteria and on these methods of calculating a substantial number of pediatric patients. FDA also sought comment on whether cost to the manufacturer should justify a waiver.

FDA received many comments on the waiver provisions of the proposal, and has made certain changes in response to the comments, as described below.

22. As proposed, new drugs and biologics are presumptively required to be studied in pediatric patients, unless a waiver is granted. The presumption in the proposal was supported by comments from pediatricians, a pharmacy organization, disease specific organizations, and medical societies, including the AAP. Several industry comments argued, however, that new drugs and biologics should presumptively not be covered by the rule, unless they were specifically identified by FDA as needing to be studied. One of these comments stated that companies should not have to waste the effort of applying for waiver for drugs of no potential benefit to pediatric patients, which the comment estimated as a majority of those developed.

FDA continues to believe that it is appropriate to presume that drugs and biologics should be studied in pediatric patients, and that this presumption should be overcome only if there are clear grounds for concluding that such studies are unnecessary. Pediatric patients are a significant subpopulation, affected by many of the same diseases as adults, and are foreseeable users of new drugs and biologics. The agency has stated, in the context of pediatric studies and other subpopulations, that an application for marketing approval should contain data on a reasonable sample of the patients likely to be given a drug or biological product once it is marketed (59 FR 64240 at 64243; 58 FR 39406 at 39409, July 22, 1993). FDA does not believe that the cost of drafting a waiver request will be great, particularly where the basis for the waiver is that the product has no potential use in pediatric patients. To assist sponsors in preparing such waivers, FDA has included in this document a partial list of diseases that are unlikely to occur in pediatric patients and for which waiver requests need include only reference to this document.

23. FDA received many comments on the proposed criteria for waiving pediatric studies. A few comments supported the proposed criteria. Many comments from pediatricians, medical societies, and disease-specific organizations argued that the proposed grounds for waiver were too broad. Several of these stated that the rule should apply to drugs for all conditions that affect pediatric patients unless there is a special reason not to do so. One comment argued that waivers should be available only for drugs known to be extremely toxic in pediatric patients or to have no anticipated use in pediatric patients.

Other comments from the pharmaceutical industry argued that the waiver provisions were too narrow. One comment from a generic trade association urged that pediatric studies be required only when there is a significant public health concern with respect to the safety of a drug product in pediatric patients or to the availability of adequate pharmacological intervention for pediatric patients for the indication. Another comment stated that the criteria in the proposal ''do not begin to address the complexities associated with moving forward on a clinical development plan'' and argued that additional criteria should include: (1) The lack of correlative safety evidence, (2) liability concerns, and (3) prohibitive cost (but the sponsor, not FDA, should be allowed to determine the importance of cost).

FDA believes that the criteria for waiver in the final rule strike a careful balance. On the one hand, requiring studies for all new products would have potentially severe resource implications for manufacturers and the agency. On the other hand, obtaining studies only where the studies impose no burden on the sponsor would continue to expose millions of pediatric patients to unnecessary risks and ineffective treatment. Requiring pediatric studies only of those drugs or biologics that offer a meaningful therapeutic benefit or that are expected to be used in a substantial number of pediatric patients focuses limited resources on those products that are most critically needed for the care of pediatric patients.

24. Several comments addressed the definition of ''meaningful therapeutic benefit.'' Some comments from the pharmaceutical industry stated that ''meaningful therapeutic benefit'' should be defined as it is used in 21 CFR 314.500. (That regulation applies to drugs ''that provide meaningful therapeutic benefit to patients over existing treatments (e.g., ability to treat patients unresponsive to, or intolerant of, available therapy, or improved patient response over available therapy).'') One of these comments

suggested that analogous cases in the pediatric context would be: (1) Where the drug treats a pediatric disease for which no other treatments exist; (2) where the drug treats patients who are unresponsive to or intolerant of other drugs; or (3) where the drug produces a superior response over other treatments. One industry comment argued that the agency should consult with the sponsor, and the pediatric investigators involved to assess whether the drug will provide a ''meaningful therapeutic benefit.'' According to the comment, the assessment should include the likely use of the product in a specific pediatric population, the likely benefit without increased risk to patients versus existing treatments, a ''definitive need'' for a new therapy in very serious or life-threatening illnesses, and the cost and feasibility of developing the necessary formulations and of conducting studies. Another comment from a disease-specific organization argued that ''meaningful therapeutic benefit'' should be a relative term, depending on the severity of the illness, the potential risk posed by the drug, and the availability of alternative treatments. One comment from a medical society devoted to the treatment of psychiatric disorders contended that ''meaningful therapeutic benefit'' should mean that the product enables a child to function better, and participate in age-appropriate activities, such as playing and going to school, without undue pain and suffering from the disease or disorder. Another comment argued that ''meaningful therapeutic benefit'' should mean better response or ability to treat nonresponsive patients. Another comment maintained that the presumption should be that a product represents a meaningful therapeutic benefit in pediatric patients if it is expected to provide a meaningful therapeutic benefit in adults.

Several comments from the pharmaceutical industry contended that it is not possible to define meaningful therapeutic benefit before approval or that FDA should not be responsible for defining it. A pharmaceutical trade association argued that meaningful therapeutic benefit is the decision of the sponsor, not FDA, and that it is not possible to determine meaningful therapeutic benefit until a drug has been used for some period of time. Another comment maintained that FDA must first have adult data to reach the conclusion that a drug offers a meaningful therapeutic benefit. The same comment also argued that a rigorous determination of meaningful therapeutic benefit would require randomized, controlled trials in pediatric patients.

FDA disagrees that it is impossible or beyond FDA's expertise to reach a conclusion before approval about whether a product has the potential to offer a meaningful therapeutic benefit. FDA routinely estimates the therapeutic benefit of new drugs and biologics at the time applications are first submitted, in order to determine whether to assign ''Priority'' (expedited) status to the review of the application. In assigning Priority status to new drug applications, CDER determines whether the product, if approved, ''would be a significant improvement compared to'' marketed (or approved, if such is required) products, including nondrug products or therapies. ''Improvement can be demonstrated by, for example: (1) Evidence of increased effectiveness in treatment, prevention, or diagnosis of disease; (2) elimination or substantial reduction of a treatment-limiting drug reaction; (3) documented enhancement of patient compliance; or (4) evidence of safety and effectiveness in a new subpopulation'' (Ref. 16). These criteria are similar to many of the criteria suggested in the comments. FDA notes that demonstration of an advantage over existing products may come from evidence other than head-to-head comparisons of the new product and existing products. For example, in some cases a new product could be shown to lack an adverse effect associated with an existing product, or to have an effect on a different outcome or on a different stage of disease than an existing product, without a direct comparison of the two products.

FDA has concluded that in determining whether a product offers a meaningful therapeutic benefit, it will use the Priority definition, with some modifications. First, in determining whether a product is expected to be an improvement over other products, the comparison will be made only to other products that are already adequately labeled for use in the relevant pediatric population. Second, it is often therapeutically necessary to have two or more therapeutic options available, because some patients will be unresponsive to a given therapy. Because the Priority definition would not cover more than the first or second product for a given indication or in a given class (unless the product offered an advantage over others for the indication or in the class), a drug or biologic will also be considered to provide a meaningful therapeutic benefit if it is in a class of drugs and for an indication for which there is a need for additional therapeutic options. The specific number of products needed will depend upon such factors as the severity of the disease being treated, and the adverse reaction profile of existing therapies. FDA has added this definition of meaningful therapeutic benefit to §§ 314.55(c)(5) and 601.27(c)(5). This rule's definition of meaningful therapeutic benefit is intended to apply only in the pediatric study context and is not intended to alter the definition of a Priority drug.

25. Several comments addressed the definition of ''a substantial number of pediatric patients.'' A few comments argued that it would be difficult to estimate product use until after marketing. Several comments argued that FDA should not base waivers on the number of patients or prescriptions. Many other comments claimed that the proposed numerical cut-offs are arbitrary. These comments maintained that waivers should be decided on a case-by-case basis. Several comments urged that FDA consult with an expert panel in deciding whether pediatric use was substantial.

Comments from the pediatric community contended that the numerical cut-offs in the proposal were too high, and would preclude studies of many serious diseases affecting fewer than 100,000 pediatric patients. One comment, for example, voiced concern that pediatric patients with less common seizure types may not benefit from the regulations because the use is not sufficiently widespread. Another comment argued that numerical cut-offs should not apply to drugs for serious and life-threatening diseases, unless the number of pediatric patients was so low as to make clinical study impossible. Another comment suggested that studies be required not only for uses greater than 100,000 prescriptions, but for ''drugs used chronically for a defined, though smaller group of pediatric patients, usually for organ-specific diseases, such as kidney failure or hypertension.''

Comments from the pharmaceutical industry argued that the numerical cut-offs proposed by FDA were too low. Some of these comments argued that 100,000 prescriptions per year translates to fewer than 100,000 patients, and that the resulting population could be so small that it would be difficult to study. Several of these comments urged that cut-off for substantial use be 200,000 patients with the disease, the threshold established by the Orphan Drug Act for identifying rare diseases.

FDA has decided to revise its proposed method of defining a substantial number of patients, in light of the comments. Physician mention

data from the IMS National Disease and Therapeutic Index (Ref. 38), which tracks the use of drugs by measuring the number of times physicians mention drugs during outpatient visits, shows that pediatric use of drugs is generally grouped in two distinct ranges. Physician mentions of drugs for pediatric use generally fall either below 15,000 per year or above 100,000 per year. Few drugs fall within the two ranges. Thus, selecting a cut-off for ''substantial number of pediatric patients'' in the middle of the two ranges will provide a reasonable discrimination between products that are widely used and those that are less commonly used, and the specific number chosen will not arbitrarily include or exclude a significant number of drugs. FDA has therefore chosen 50,000 as the cut-off for a substantial number of pediatric patients. Because the number of pediatric patients with the disease is easier to determine than the number of prescriptions per year, a substantial number of pediatric patients will be defined as 50,000 pediatric patients with the disease for which the drug or biological product is indicated. Although physician mentions per year does not correspond exactly to the number of patients with the disease, they provide a rough approximation and the IMS data show that the number of products included or excluded is relatively insensitive to changes in the cut-off chosen. As proposed, a partial waiver for a particular pediatric age group would be available under this method if 15,000 patients in that age group were affected by the disease or condition. This definition of ''a substantial number of pediatric patients'' has not been codified, however, and FDA may modify it, after consulting with the pediatric panel discussed in section III.M of this document (''Pediatric Committee''). Any modification will be issued as a guidance document.

In response to those comments that voiced concern that this definition would exclude a number of serious diseases, FDA emphasizes that the definition of ''meaningful therapeutic benefit'' assures that drugs and biologics will be covered by the rule if they are medically needed as therapeutic options because there are insufficient products adequately labeled for pediatric patients for that indication or in that drug class. Until there are enough adequately labeled products available, many new drugs and biologics for serious and life-threatening diseases will be considered to offer a meaningful therapeutic benefit and thus will be required to be studied, even if the products are not also used in a substantial number of pediatric patients. This will be particularly true during the first few years after implementation of this rule when few drugs and biologics will yet be adequately labeled for use in pediatric patients, and a larger proportion of new entrants into the marketplace will be considered to be medically necessary therapeutic options.

In response to the comments arguing that FDA's proposed numerical cut-off is too low and will result in too many pediatric studies, FDA expects to defer until after approval many of the studies of products that will be used in a substantial number of pediatric patients but that do not offer a meaningful therapeutic benefit. As described previously in response to comments on the deferral provisions, studies of new drugs and biologics that do not offer a meaningful therapeutic benefit and are members of a class that is already adequately labeled for pediatric patients are likely to be deferred until well after approval of the product for adults.

26. A few comments addressed the provisions that would permit waiver if pediatric trials were impossible or impractical. One comment argued that the provision authorizing waiver if the proposed population was ''too small or geographically dispersed'' was too broad. This comment urged that tests should be waived only if ''significant efforts to recruit patients fail.'' The comment also argued that the unsupported suggestion that tests are ''impractical'' should not be accepted, and that evidence of due diligence should be required. Another comment argued that waivers should never be granted because the population is too small or dispersed. According to this comment, many safety and pharmacokinetic studies are already performed in dispersed populations, and the comment maintained that no experimental drug should be administered to a child with a serious or life-threatening disease without requiring that some safety data and pharmacokinetics data be obtained. Another comment observed that although only 600 renal transplants are performed each year in pediatric patients, pediatric academic centers have been creative in forming collaborative efforts to study these small groups. One comment from an organization devoted to children with HIV stated that the ''impossible or highly impractical'' standard must be narrowly interpreted, and that a manufacturer should show that all reasonable efforts to recruit patients have failed. According to this comment HIV/AIDS drugs should be a benchmark of when a waiver should not be granted: Any group as big or bigger than the pediatric AIDS population should be considered big enough to study.

Another comment argued that because of special difficulties encountered in recruiting pediatric patients into studies of blood products, such as parental fear of disease transmission, the inability to obtain a sufficient number of test subjects should be added to the criteria for waiver or to the definition of ''highly impractical.''

FDA agrees with those comments urging that this ground for waiver be interpreted narrowly and that unsupported assertions be rejected as a basis for waiver. Although the number of patients necessary to permit a study must be decided on a case-by-case basis, FDA agrees that there are methods available to conduct adequate studies in very small populations. Moreover, where only safety or pharmacokinetic studies are required to support pediatric labeling, the size of the population or geographic dispersion would only rarely be a sufficient basis to consider trials impossible or highly impractical. Because of the speed and efficiency of modern communications tools, geographic dispersion will justify a waiver only in extraordinary circumstances and will generally have to be coupled with very small population size. FDA is not persuaded that inability to recruit patients because of parental fears associated with administration of the drug is an adequate basis to conclude that studies are impractical where there is also evidence that similar products are regularly prescribed to pediatric patients outside of clinical trials.

27. Several comments responded to the request for comment on whether cost should justify a waiver. Comments from the pediatric community argued that cost to the manufacturer should never or rarely justify a waiver. Two of these comments stated that the cost of failure to study is always higher than the cost of research. Another comment stated that cost may be a factor, but FDA must be careful not to allow studies to be waived automatically because they ''cost too much.'' Two comments from a pharmaceutical company and a pharmaceutical trade association argued that FDA should not have responsibility for assessing the costs of a study.

In light of the comments, FDA has concluded that it does not have an appropriate basis to evaluate and weigh cost in granting or declining to grant a waiver. Therefore, cost will not ordinarily be a factor in determining whether a waiver should be granted.

28. One comment claimed that the proposal lacks adequate regulatory procedures for timely processing of waiver requests and will result in a new layer of bureaucracy.

As described previously in response to comments on the deferral provisions, preliminary decisions on whether to grant waivers will be provided to the sponsor at the end of phase 1 for drugs and biologics for life-threatening diseases and at the end of phase 2 for other products. FDA does not agree that processing of waiver requests will result in a new layer of bureaucracy. The decisions will be made by the division responsible for reviewing the NDA or BLA. FDA intends to ensure that the process is timely and fair. To reduce the burden on manufacturers in applying for waivers and deferrals, FDA intends to issue a guidance document providing a format for a request for waiver or deferral.

29. One comment asked that the rule clarify that the onus is on the manufacturer to justify waivers. Another comment argued that the proposed standard for granting a waiver (''reasonable basis'') places an inadequate burden of proof on manufacturers. According to this comment, manufacturers should be required to present ''persuasive proof,'' and FDA should have to find that the grounds for waiver have ''in fact'' been met.

FDA agrees that the burden is on the manufacturer to justify waivers, but believes that the rule already adequately imposes that burden. The rule requires both a certification from the manufacturer that the grounds for waiver have been met and an adequate justification for the waiver request. FDA believes that it would be inappropriate to require ''proof'' that the grounds for waiver have ''in fact'' been met because each ground requires a degree of speculation about the safety and effectiveness of, or the ability to test, a product, in a population in which it has not yet been tested.

30. Many comments from pediatricians, disease-specific organizations, a pharmacists' organization, a medical society, several companies, a pharmaceutical trade association, and the AAP urged that the decision to require pediatric studies be reviewed by a panel of outside pediatric experts. Some of the comments recommended that the panel include industry representatives. The comments were divided on whether the panel would review only waiver requests or would be responsible for identifying, in the first instance, those drugs that need study. Some of these comments believed that the rule should include no criteria for granting waivers and that the decision should be made on a case-by-case basis in consultation with the expert panel.

As described later in this document, FDA intends to convene a panel of pediatric experts, which will include one or more industry representatives, to assist the agency in implementing this rule. FDA will bring before that panel some issues related to waivers. FDA does not believe, however, that it is reasonable to bring every product undergoing clinical studies before the panel for a decision on whether pediatric studies are required. Because many dozens of drugs and biologics reach the end of phase 1 and phase 2 each year, and the panel could not realistically meet more than once every few months, insisting that each product be brought before the panel would introduce substantial delay into the development and review of drugs and biologics. Moreover, many waiver decisions will be straightforward and noncontroversial.

FDA does, however, agree that it would be beneficial to have the advice of pediatric experts on its administration of the waiver provisions of the rule. FDA will therefore ask the panel, at least on an annual basis for the first several years, to review the agency's waiver decisions and provide advice on whether it believes that the criteria used in making those decisions were appropriate. FDA will use the advice it receives to modify future waiver decisions. FDA also expects to consult with individual members of the panel on difficult waiver decisions in their fields of expertise.

31. One comment suggested that FDA identify diseases that are not likely to occur in pediatric patients, such as prostate cancer, and classes of drugs not likely to be used in pediatric patients, and grant blanket waivers. Another comment listed the following product classes as having no applicability to pediatric patients: Alcohol abuse agents, Alzheimer's agents, Amyotrophic lateral sclerosis agents, antifibrosis therapy, antiparkinsonian agents, fertility agents, gout preparations, multiple sclerosis drugs, oral hypoglycemics, osteoporosis agents, oxytocics, tremor preparations, uterine relaxants, and vasodilators (including cerebral vasodilators).

FDA agrees that there are some disease and drug classes that have extremely limited applicability to pediatric patients and that waiver is appropriate for these. The decision to grant a waiver in such cases would be based on a conclusion that a disease does not have sufficient significance in the pediatric population (either because of frequency or severity) to constitute a meaningful therapeutic benefit for pediatric patients or to be used in a substantial number of pediatric patients. FDA emphasizes that this decision would not be intended to prevent or impede studies of these diseases or drug classes in the pediatric population, should a sponsor wish to conduct them.

The agency has identified the diseases following for which waivers will be likely to be granted. Some of the diseases listed in the comment are included in FDA's list. Others, such as osteoporosis, gout, multiple sclerosis, and tremors can develop in children, and are not included in FDA's list. Waiver decisions on products for the listed diseases are expected to be straightforward and noncontroversial. FDA may add to or revise this list in the future by issuing guidance documents. An applicant who wishes to obtain a waiver because the product is indicated for a disease on the list may refer in the waiver request to this **Federal Register** notice, or to any guidance document modifying this notice. FDA's list follows:

1. Alzheimer's disease.
2. Age-related macular degeneration.
3. Prostate cancer.
4. Breast cancer.
5. Non-germ cell ovarian cancer.
6. Renal cell cancer.
7. Hairy cell Leukemia.
8. Uterine cancer.
9. Lung cancer.
10. Squamous cell cancers of the oropharynx.
11. Pancreatic cancer.
12. Colorectal cancer.
13. Basal cell and squamous cell cancer.
14. Endometrial cancer.
15. Osteoarthritis.
16. Parkinson's disease.
17. Amyotrophic lateral sclerosis.
18. Arteriosclerosis.
19. Infertility.
20. Symptoms of the menopause.

F. Pediatric Use Section of Application

FDA proposed to add § 314.50(d)(7), under which applicants would be required to include in their applications a section summarizing and analyzing the data supporting pediatric use information for the indications being sought. FDA received no comments on this provision. The new pediatric use section will be required to contain only brief summaries of the studies together with a reference to the full description of each provided elsewhere in the application.

G. Planning and Tracking Pediatric Studies

1. Sections 312.23(a)(3)(v), 312.47 (b)(1)(i), (b)(1)(iv) and (b)(2), and 312.82—Early Discussion of Plans for Pediatric Studies

In the proposal, FDA identified several critical points in the drug development process, before submission of an NDA or BLA, during which the sponsor and FDA should focus on the sponsor's plans to assess pediatric safety and effectiveness. These time points include: Any pre-IND meeting or ''end-of-phase 1'' meeting for a drug designated under subpart E of part 312 (21 CFR part 312), the IND submission, the IND annual report, any ''end-of-phase 2'' meeting, the presentation of the IND to an FDA drug advisory committee, and any pre-NDA or pre-BLA meeting. Of these, the pre-IND meeting, the ''end-of-phase 1'' meeting, the IND submission, the IND annual report, the ''end-of-phase 2'' meeting, and the pre-NDA/pre-BLA meeting are codified in part 312, FDA's regulations governing IND's.

In a separate rulemaking, FDA has already amended the IND annual report requirement to include discussion of pediatric patients entered in trials (63 FR 6854, February 11, 1998). In the proposal, FDA proposed to amend §§ 312.23(a)(3)(v), 312.47 (b)(1)(i) and (b)(2), and 312.82 (a) and (b) to specify that these meetings and reports should include discussion of the assessment of pediatric safety and effectiveness. To assist manufacturers in planning for studies that may be required under this proposal, FDA also proposed to inform manufacturers, at the ''end-of-phase 2'' meeting, of the agency's best judgment, at that time, of whether pediatric studies would be required for the product and when any such studies should be submitted. The proposal also stated that, in addition to the discussions of pediatric testing codified in the proposal, FDA would assist manufacturers by providing early consultations on chemistry and formulation issues raised by requirements under this rule.

Because, as described previously, studies of drugs and biologics for life-threatening diseases may begin as early as the end of phase 1, FDA will, at the end-of-phase 1 meeting, provide the sponsor of such a product the agency's best judgment, at that time, whether pediatric studies will be waived or deferred. Section 312.82(b) has been revised to include this requirement. Because studies of other products may begin as early as the end of phase 2, FDA will, at the end-of-phase 2 meeting, provide the agency's best judgment, at that time, whether waiver or deferral is appropriate. Although a formal request for deferral or waiver is not required until submission of the NDA or BLA, FDA has revised § 312.47(b)(1)(iv) to state that a manufacturer who plans to seek a waiver or deferral should provide information related to the waiver or deferral in the advance submission required before the end-of-phase 1 or end-of-phase 2 meeting, as appropriate.

As described earlier, a pediatric study required under this rule may be eligible for exclusivity under FDAMA, if such study ''meets the completeness, timeliness, and other requirements of [section 505A].'' (See 21 U.S.C. 355A(i).) Among other requirements, a pediatric study must, to be eligible for exclusivity, be responsive to a written request for the study from FDA. To obtain a written request, a manufacturer may submit a proposed written request to FDA that contains the information described in a guidance document issued by FDA entitled, ''Qualifying for Pediatric Exclusivity Under Section 505A of the Federal Food, Drug, and Cosmetic Act.'' A manufacturer who has been told in the end-of-phase 1 or end-of-phase 2 meeting that it is FDA's best judgment at that time that it does not intend to waive the study requirement may submit a proposed written request at any time thereafter. FDA will issue a written request for a study required under this rule promptly after an adequate proposed written request is submitted.

FDA also sought comment on the types of evidence that FDA should examine to ensure that deferred pediatric studies are carried out in a timely fashion. In response to comments, FDA has revised §§ 312.47 (b)(1)(iv) and (b)(2) to require submission of information about planned and ongoing pediatric studies.

32. One comment supported the proposed provisions and the need for early consultation with sponsors, stating that discussions should take place as early as possible in drug development. The comment urged that proposed § 312.47(b)(1) be revised to acknowledge the possibility that studies could already be underway.

FDA agrees with this comment and has revised § 312.47(b)(1) as suggested in the comment.

33. Several comments provided suggestions on how to assure that deferred studies are carried out expeditiously. One comment urged that the criteria to ensure deferred studies are carried out in a timely fashion be modeled on the AIDS Clinical Trials Group (ACTG) system of National Institute of Allergy and Infectious Diseases (NIAID). Another comment recommended that evidence demonstrating that the required studies were underway be submitted to FDA within 6 months of approval. This comment suggested that the evidence should include: (1) A finalized protocol, (2) evidence of sufficient entry of patients to address the objective of the protocol, and (3) a time line for data analysis and submission to FDA. Another comment argued that the burden should be on manufacturers to provide evidence that studies are being conducted with due diligence through submission of protocols, progress reports and certifications by researchers. To hold manufacturers accountable, this comment suggested that nonproprietary information related to deferrals be made available to the public, including deferral requests, FDA action, postmarketing status reports, and the time line for deferred studies. One comment argued that FDA's current procedures are adequate to track the timeliness of pediatric studies. A pharmaceutical trade association argued that FDA should institute an adequate tracking system and meet periodically with the sponsor to discuss the progress of the studies, but that no new rules are needed.

FDA agrees that an adequate system for ensuring that studies, both deferred and nondeferred, are carried out in a timely manner requires the submission of plans and progress reports from the sponsor at defined intervals. As described previously, FDA will provide sponsors with a preliminary decision on whether pediatric studies will be required and their timing at the end-of-phase 1 meeting, for drugs and biologics for life-threatening diseases, and at the end-of-phase 2 meeting, for other products. FDA has revised § 312.47(b)(1)(iv) to state that sponsors should submit, in the advance submission for the end-of-Phase 2 meeting, a proposed time line for protocol finalization, enrollment, completion, data analysis, and submission of pediatric studies, or, in the alternative, information to support a planned request for waiver or deferral. For drugs and biologics for life-threatening diseases, the submission should be made in advance of the end-of-Phase 1 meeting. FDA has also revised § 312.47(b)(2)(iii) to state that sponsors should submit, in the submission in advance of the pre-NDA or pre-BLA meeting, information on the status of needed and ongoing pediatric studies. The proposed language of § 312.47 has been slightly modified to

seek information on ''needed'' and ongoing studies rather than ''planned'' and ongoing studies. This change has been made because not every sponsor elects to have an end-of-phase 1 or end-of-phase 2 meeting. In those cases, the need for a pediatric study may be discussed for the first time at the pre-NDA or pre-BLA meeting. FDA has also revised the title of § 312.47(b)(2) from '' 'Pre-NDA' meetings'' to '' 'Pre-NDA' and 'pre-BLA' meetings.'' This is merely a clarification, because part 312 is expressly applicable to products subject to the licensing provisions of the Public Health Service Act, as well to products subject to section 505 of the act and 21 CFR 312.2(a).

2. Sections 314.81(b)(2) and 601.37—Postmarketing Reports

To permit FDA to monitor the conduct of postapproval studies to ensure that they are carried out with due diligence, FDA proposed to amend § 314.81(b)(2) of the postmarketing report requirements to require applicants to include in their annual reports: (1) A summary briefly stating whether labeling supplements for pediatric use have been submitted and whether new studies in the pediatric population to support appropriate labeling for the pediatric population have been initiated; (2) where possible, an estimate of patient exposure to the drug product, with special reference to the pediatric population; (3) an analysis of available safety and efficacy data in the pediatric population and changes proposed in the label based on this information; (4) an assessment of data needed to ensure appropriate labeling for the pediatric population; and (5) whether the sponsor has been required to conduct postmarket pediatric studies and, if so, a report on the status of those studies. (Additional postmarketing reporting requirements are described under ''Remedies'' in section III.L of this document.) Although the proposal was intended to cover both drugs and biological products, the proposal inadvertently omitted a postmarketing reports requirement specifically applicable to biological products. In the final rule, FDA has corrected this oversight and included an identical postmarketing reports requirement in § 601.37.

FDA notes that FDAMA includes a provision requiring reports of postmarketing studies in a form prescribed by the Secretary of Health and Human Services (the Secretary) in regulations. (Section 506 of the act (21 U.S.C. 356B).) At such time as regulations implementing this provision are issued, FDA may modify or withdraw §§ 314.81(b)(2) and 601.37 for consistency with the implementing regulations.

34. Three comments from the pharmaceutical industry agreed that it was appropriate to require postmarketing reports on the progress of postapproval pediatric studies. One comment argued, however, that collection of this information along with an adequate system to track pediatric studies could preclude the need to finalize the rule. Another comment argued that the required analyses of pediatric data ''may lead to exposure of a larger number of children to an unapproved product.'' This comment also contended that estimates of patient exposure are difficult to obtain and unreliable.

FDA disagrees that postmarket reports and a tracking system are an adequate means of assuring that drugs and biologics are appropriately labeled for pediatric use. As shown above, even postmarket commitments to conduct pediatric studies have infrequently resulted in pediatric labeling submissions. FDA also disagrees that the analyses required under § 314.81(b)(2) require exposure of any new patients. The analyses referred to in the provision are of already collected data. Finally, the rule requires estimates of patient exposure ''where possible.'' If there are no data on which to make such estimates, the estimates are not required. FDA notes, however, that there are commercial data bases designed to estimate use of marketed drugs.

35. One comment argued that FDA should require postmarket surveillance of approved drugs that do not have pediatric labeling, to generate helpful comparative information and provide additional information useful for analysis of adverse event profiles.

The provisions of the final rule require manufacturers of approved drugs without pediatric labeling to conduct postmarket surveillance on their products and provide an analysis of available safety and efficacy data in the pediatric population.

H. Studies in Different Pediatric Age Groups

Because the pharmacokinetics and pharmacodynamics of a drug or biological product may be different in different pediatric age groups or stages of development, FDA proposed to require an assessment of safety and effectiveness in each pediatric age group for which a waiver was not granted. The following age categories for the pediatric population were distinguished in the proposal: (1) Neonates (birth to 1 month); (2) infants (1 month to 2 years); (3) children (2 years to 12 years), and (4) adolescents (12 years to 16 years). The proposal stated that the need for studies in more than one age group would depend on whether the drug or biological product was likely to be used or offered meaningful therapeutic benefit in each age group (see ''Waivers'' section III.E of this document), the metabolism and elimination of the drug, and whether safety and effectiveness in one age group could be extrapolated to other age groups. The proposal further stated that it would not ordinarily be necessary to establish effectiveness in each age group, but there would generally need to be pharmacokinetic data in each group to allow dosing adjustments. The proposal recognized that studies in neonates and young infants present special problems, and sought comment on whether it is appropriate to require the assessment of safety and effectiveness in this age group.

36. Several comments addressed the requirement that all relevant age groups be studied. Some comments opposed studies in more than one age group. One comment contended that requiring safety data in each pediatric group may place an unnecessary burden on the sponsor, and that FDA should require safety data only in one group, presumably that with the highest potential use. Another comment claimed that requiring studies in all four age groups would almost never be justified. In most cases, according to this comment, it should be possible to study a single subgroup and extrapolate. Other comments argued that studies in more than one age group could be necessary depending on the pharmacokinetics of the drug, the disease, and expected use of the drug. Most of these comments stated that the type and extent of studies in different age groups must be decided on a case-by-case basis. Several comments contended that drugs should be studied in each age group in which they are expected to be used. One comment stated that studies in toddlers are especially needed. A comment from an organization devoted to pediatric AIDS argued that all age groups should be studied unless the manufacturer provides compelling evidence that it would be impossible or virtually impossible to study that group.

FDA continues to believe that studies in more than one age group may be necessary, depending on expected therapeutic benefit and use in each age group, and on whether data from one age group can be extrapolated to other age groups.

37. Many comments argued that the pediatric subgroups identified in the proposal were arbitrary and that FDA should be flexible in determining which age ranges or stages of development need to be studied. A comment from a pharmaceutical trade association contended that rigid age divisions for required studies were inappropriate, and that the method by which the compound is cleared from the body must be considered in light of what is known about physical development. The AAP stated that the groups identified in the proposal provide acceptable guidelines, but should not be adhered to rigidly. One comment argued that the definition of pediatric patients should include all subgroups of growth and development from 0 to 21 years.

FDA agrees that the age ranges identified in the proposal may be inappropriate in some instances and that it will be reasonable in some cases to define subgroups for study using other methods, such as stage of development. FDA has deleted the references in the rule to specific age ranges.

38. Several comments addressed inclusion of neonates in studies. One comment maintained that because neonates are a special challenge, they should not ordinarily be included in studies under this rule. Another comment described the difficulties in conducting studies in infants and neonates and recommended that before studies in this group there be an assessment of ''the expected extent of use and potential benefit in this patient population'' and an evaluation of safety data in adults and older pediatric patients. One comment contended that there are not many instances in which the benefit will outweigh the risk of exposing neonates and young infants to drugs. This and another comment also argued that it is not always possible to extrapolate from data in older pediatric patients. A pharmaceutical trade association maintained that validated end-points and ability to assess these by age should determine which age groups to include, and that it may not be possible to study certain end-points in very young pediatric patients. One comment argued that early research on neonates raises special ethical issues. Citing the 1977 FDA guideline, this comment asserted that testing in neonates should occur only when substantial evidence of benefit or superiority over accepted agents has been demonstrated in older pediatric patients and adults.

Other comments argued that neonates should not be excluded from studies. According to one comment, study designs will be appropriate and necessary ethical issues will be addressed if neonatologists are included in the review of studies. Another comment stated that neonates represent the greatest disparity in drug disposition compared to adults, and that, on a scientific and ethical basis, they must therefore be included in drug studies. The AAP stated that premature infants, newborns, and infants are more difficult to study, but that the difficulties do not outweigh the importance of studying them. According to this comment, inadequate study of neonates has led to frequent and severe toxicity. This comment agreed that it is inappropriate to extrapolate from older pediatric patients to the youngest age group.

FDA agrees that the benefits and risks to premature infants, neonates, and infants must be carefully weighed before these pediatric patients are included in pediatric studies. Although the agency believes that studies in these groups may be frequently waived or deferred until adequate safety data have been collected, there will be cases in which the drug or biologic is important and expected to be used in these groups. In such cases, it will be appropriate to require studies in these groups. To exclude them from study would be to subject the most vulnerable patients to the risks of the drugs in clinical use without adequate information about safety or dosing. FDA agrees that studies in neonates and young infants raise special ethical issues, but once these issues are addressed in each case, the studies should proceed.

I. Pediatric Formulations

As described in the proposal, testing of a product in pediatric patients could require the development of a pediatric formulation. Many young children are unable to swallow pills and may require a liquid, chewable or injectable form of the product. A standardized pediatric formulation also ensures bioavailability and consistency of dosing, compared to alternatives such as mixing ground-up tablets with food, and permits meaningful testing of safety and effectiveness. FDA proposed in §§ 201.23, 314.50(g)(1) (now 314.55(a)) and 601.27(a) to require a manufacturer to produce a pediatric formulation, if one were necessary, only in those cases where a new drug or new biological product provided a meaningful therapeutic benefit over existing treatments, and where the study requirement had not been waived in the age group requiring the pediatric formulation. The proposal recognized that the difficulty and cost of producing a pediatric formulation may vary greatly depending upon such factors as solubility of the compound and taste. FDA proposed to waive the requirement for pediatric studies (see ''Waivers'' in section III.E of this document) in age groups requiring a pediatric formulation, if the manufacturer provided evidence that reasonable attempts to produce a pediatric formulation had failed.

FDA sought comment on whether it is appropriate to require a manufacturer to develop a pediatric formulation, on whether the cost of developing a pediatric formulation should ever justify a waiver of the pediatric study requirement, and on how to define ''reasonable attempts'' to develop a pediatric formulation.

39. Many comments from the pediatric community argued that it is appropriate to require manufacturers to produce pediatric formulations. Several comments from pediatricians and parents described the difficulties and uncertainties in attempting to administer adult formulations to pediatric patients, and argued that pediatric formulations are essential to assure bioavailability, accurate dosing, and patient compliance, and to avoid wasting medications. The AAP argued that FDA should require development of an appropriate formulation for each age group for which the drug will be used, taking into account ease of administration and ability to dose accurately.

Comments from the pharmaceutical industry described technical problems in producing pediatric formulations, including stability, taste and palatability, and claimed that FDA underestimated these difficulties. Some of these comments maintained that requiring development of pediatric formulations during the investigational phase will necessitate diversion of resources, increase the cost of the adult formulation, and create a disincentive to produce drugs with pediatric uses. One comment argued that it would be wasteful to require development of a pediatric formulation before some evidence of effectiveness has been collected and dose selection has been achieved, because before that time the drug could be abandoned because of lack of safety or effectiveness. A pharmaceutical trade association opposed a pediatric formulation requirement, arguing that the government has no right to tell manufacturers what products to market. This comment stated that only if FDA successfully demonstrated that ''all attempts to develop a voluntary solution have failed'' might the industry consider other options. One comment stated that

a single drug could require more than one pediatric formulation for different pediatric age group, such as a chewable tablet, a nonalcohol containing liquid, and sprinkles. Counting failed attempts, this comment claimed that producing a pediatric formulations may cost millions of dollars.

FDA believes that for drugs and biologics that offer a meaningful therapeutic benefit to pediatric patients, it is essential to provide pediatric formulations that ensure bioavailability and accurate dosing. FDA disagrees that it is inappropriate for the government to require manufacturers to produce pediatric formulations. As many comments demonstrated, adult formulations of these drugs are frequently used in pediatric patients because there is no other choice. Drug manufacturers profit from these uses, but do not take responsibility for them. Where a product is commonly being used in a subpopulation for an indication recommended by the manufacturer, it is appropriate to require the manufacturer to take steps to ensure that the use is safe and effective.

FDA agrees that producing a pediatric formulation can be difficult or, rarely, impossible and has attempted to account for this problem by permitting waiver of the pediatric study requirement where reasonable attempts to produce a pediatric formulation have failed. FDA notes that the pharmaceutical industry did not respond to FDA's request to help define what should constitute such ''reasonable attempts.''

To permit pediatric studies that may begin, for products for life-threatening diseases, at the end of phase 1, or, for other products, at the end of phase 2, it may be necessary to begin development of a pediatric formulation before initiation of clinical trials. FDA does not agree that it is wasteful to begin development of a pediatric formulation at this stage. This rule is premised on the view that for drugs and biologics that will have important use in pediatric patients, it is the responsibility of the manufacturer to ensure that use is safe and effective. Although some such products may ultimately prove to be unsafe or ineffective, work on pediatric formulations of such products is not necessarily more wasteful than work on adult formulations. FDA does not agree that manufacturers will be required to develop several pediatric formulations for different age groups. Even for a drug that was to be used in all pediatric age groups, a liquid formulation, e.g., might be usable in all age groups.

FDA has no basis to conclude that producing pediatric formulations will increase the cost of adult formulations or create disincentives for producing drugs and biologics with pediatric uses. No evidence was submitted to support either of these assertions.

40. Several comments discussed how to define ''reasonable attempts'' to produce a pediatric formulation. The AAP argued that difficulty in producing a pediatric formulation should be a basis for waiver only if the sponsor provides data showing that formulation experts encountered insurmountable problems of solubility, stability, compatibility, or palatability using accepted methods, and that cost be given only limited consideration. The AAP urged that such an assertion be corroborated by a panel of pediatric experts and FDA as well as formulation experts. Another comment agreed that formulations appropriate for younger age groups should be developed unless the manufacturer shows it would be virtually impossible. This comment argued that if a manufacturer wants to show that the cost is prohibitive, it should provide information allowing the financial and other costs of development to be seen in terms of the entire drug development process. Another comment argued that waivers should not be based on whether reasonable efforts to develop a pediatric formulation have failed because this ground for a waiver would permit small companies to avoid producing pediatric formulations on cost grounds. This comment urged that waivers be allowed only if a pediatric formulation cannot be produced for scientific or technological reasons. One comment argued that even if producing a pediatric formulation is impossible, the manufacturer should be required to study the adult formulation in pediatric patients, because it will be used in pediatric patients.

One industry comment urged that the decision to require a pediatric formulation be made on a case-by-case basis. Another comment argued that pediatric formulations should be required only if a panel of pediatric experts concludes that there is a genuine pediatric need and substantial benefit.

FDA agrees that the burden should be on the manufacturer to provide evidence that experts in formulation chemistry had encountered unusually difficult technological problems in the development of a pediatric formulation. In determining whether those problems were sufficiently severe to warrant a waiver of pediatric studies, FDA will consider the potential importance of the product for pediatric patients. The more important the product, the more efforts should be made to develop a pediatric formulation. FDA will also, at its discretion, take to the Advisory Committee for Pharmaceutical Sciences questions about whether ''reasonable attempts'' have been made to produce pediatric formulations in particular cases. Although FDA believes that it is appropriate to consider the cost to the manufacturer in determining whether attempts to produce a pediatric formulation have been reasonable, the agency received no helpful guidance on how to assess whether the costs of producing a pediatric formulation were unreasonable. In addition to any informative cost information provided by the manufacturer, FDA will take into account whether a product is still under patent or exclusivity protection. FDA will assume that manufacturers can incur greater costs for products that have significant patent life or exclusivity remaining.

41. One comment contended that FDA chemistry requirements have increased over the last 10 years. Another comment urged that FDA be more flexible in its review of formulations, e.g., by permitting generally recognized as safe (GRAS) substances in pediatric formulations.

FDA recently held a conference on pediatric formulations at which the agency sought input from industry on identifying the regulatory issues that affect the development of pediatric formulations for both new and approved marketed drugs. At this meeting, FDA also requested proposals for solutions to facilitate the development and approval of pediatric formulations. FDA is committed to removing unnecessary burdens on the review and approval of pediatric formulations.

42. Two comments urged manufacturers to provide formulas in product labeling for extemporaneous pediatric formulations made by pharmacists. These comments stated that the current practice among hospital pharmacies is to use unvalidated formulas, resulting in a lack of consistency from one hospital to another, no stability testing, and, in some cases, reluctance to produce pediatric formulations at all because of the lack of guidance. One comment stated that information on extemporaneous formulations should be provided only where: (1) A commercial formulation is not possible or (2) the drug has extremely limited use in pediatric patients.

FDA is concerned that the availability of this approach may undermine efforts to produce standardized pediatric formulations. There are, however, one or two examples in which approved labeling carries directions for producing

extemporaneous pediatric formulations. FDA will consider, on a case-by-case basis whether such an approach is appropriate, e.g., where it has not been possible to develop a stable commercial formulation.

J. Marketed Drug and Biological Products

FDA proposed in § 201.23 to codify its authority to require, in certain circumstances, a manufacturer of a marketed drug or biological product to submit an application containing data evaluating the safety and effectiveness of the product in pediatric populations. FDA proposed to impose such a requirement only where the agency made one of two findings: (1) That the product was widely used in pediatric populations and the absence of adequate labeling could pose significant risks to pediatric patients; or (2) the product was indicated for a very significant or life-threatening illness, but additional dosing or safety information was needed to permit its safe and effective use in pediatric patients.

Before requiring a study under this section, FDA proposed to consult with the manufacturer on the type of studies needed and on the length of time necessary to complete them, and would notify the manufacturer, by letter, of the agency's tentative conclusion that such a study was needed and provide the manufacturer an opportunity to provide a written response and to have a meeting with the agency. At the agency's discretion, such a meeting could be an advisory committee meeting. If, after reviewing any written response and conducting any requested meeting, FDA determined that additional pediatric use information was necessary, FDA proposed to issue an order requiring the manufacturer to submit a supplemental application containing pediatric safety and effectiveness data within a specified time. The proposal referred to the order in one place as a letter. FDA has clarified the final rule by stating that the manufacturer will receive ''an order, in the form of a letter.'' A few other minor clarifying revisions have also been made in this section.

FDA sought comment on whether it should codify its authority to require the manufacturers of marketed drugs and biologics to conduct pediatric studies, and, if so, on the circumstances in which the agency should exercise that authority.

43. Many comments from the pediatric community agreed that FDA should codify its authority to require pediatric studies on marketed drugs. Several comments from the pharmaceutical industry argued that FDA lacked authority to require studies of marketed drugs and that the 1994 rule sufficiently addressed pediatric labeling for marketed drugs. Some comments argued that adding pediatric labeling for indications applicable to pediatric patients should be at the sponsor's discretion. Others claimed that incentives are better than requirements. One comment contended that the proposed requirement forces manufacturers ''to take on unwanted liabilities in order to maintain an asset which was created and earned under a different set of rules.'' Other comments maintained that companies should not be required to conduct new studies, and that pediatric labeling should be based on existing data, such as marketing experience and dosing regimens generally accepted by experts. A comment from a pharmaceutical trade association argued that studies should not be required but that FDA should work with industry and others to ''develop creative ways to obtain the needed labeling information'' for marketed drugs.

FDA believes that it has ample authority to require pediatric studies of marketed drugs and biologics, as described in the preamble to the 1994 rule (59 FR 64240 at 64243) and in ''Legal Authority'' section IV of this document. FDA has also concluded, as described previously, that the response to the 1994 rule and other voluntary measures have not produced a significant improvement in pediatric labeling for many marketed drugs and biologics. In addition, as one pharmaceutical company conceded, manufacturers are unlikely to initiate clinical research on marketed drugs whose patents have expired, or are about to expire. FDA has therefore concluded that where pediatric information is critical to patient care, it is necessary to require that pediatric studies be carried out. FDA notes that new requirements are sometimes imposed on already marketed consumer products when such requirements are necessary to protect the public health. FDA emphasizes, however, that it will require studies of marketed products only in the compelling circumstances described in the regulation.

44. FDA received many comments on the grounds for requiring studies of marketed products. Comments from medical societies, pediatricians, and disease-specific organizations argued that the proposed grounds were too narrow. One comment stated that pediatric studies should be required of any marketed drug that is likely to be used in pediatric patients. Several comments argued that the phrase ''very significant illness'' was ill-defined. One comment stated that it was ''so open-ended and subjective as to be impossible for use as a regulatory standard.'' Another comment suggested that any definition of ''very significant illness'' would be arbitrary and overbroad. Several comments urged that the same criteria that are applied to not-yet-approved drugs be applied to marketed drugs. One of these comments argued that even if the criteria remain as proposed, ''widely used'' and ''significant risk'' should be defined in terms of the severity of the illness. According to this comment, if the consequences of no treatment are serious, the absence of labeling should be more readily found to present a significant risk. One industry comment maintained that the requirement should apply to marketed drugs only where there is a ''compelling need'' for pediatric data. One comment argued that the requirement should apply to all marketed drugs unless an expert panel concluded that studies were not required, while other comments urged that FDA utilize an expert panel to affirmatively identify and prioritize marketed drugs that should be studied in pediatric patients. Some of these comments suggested that there be no criteria and that the panel should determine which drugs should be studied on a case-by-case basis. One comment suggested that the list should be prioritized using the number of pediatric prescriptions.

FDA believes that criteria are necessary to assure consistency and fairness in deciding which marketed drugs and biologics are studied. FDA has reviewed the grounds for requiring pediatric studies of marketed drugs and biologics and has revised them in light of the comments. FDA has concluded that the phrase ''very significant illness'' is not sufficiently defined and agrees that it would be less confusing to use the same concepts that are used in defining which new products will be subject to the pediatric study requirement. FDA has therefore replaced the concept of ''very significant illness'' and replaced it with ''meaningful therapeutic benefit.'' However, to ensure that this authority is reserved for cases in which there is a compelling need for studies, FDA has added the requirement (already present in the first criterion) that FDA also find that the absence of adequate labeling could pose significant risks for pediatric patients. The second criterion will now read:

* * * there is reason to believe that the drug product would represent a meaningful therapeutic benefit over existing treatments for pediatric patients for one or more of the claimed indications, and the absence of adequate labeling could pose significant risks to pediatric patients.

FDA has also revised the first criterion to conform more closely to the criteria for requiring studies in not-yet-approved drugs and biologics, replacing ''widely used'' with ''used in a substantial number of pediatric patients.'' FDA will use the same definition of ''substantial number'' for both marketed and not-yet-approved drugs and biologics. The first criterion will, however, continue to include the requirement that ''the absence of adequate labeling could pose significant risks to patients.'' FDA believes that the pediatric study requirement may impose greater burdens on the manufacturers of marketed drugs and biologics than the manufacturers of not-yet-approved products, and that it is appropriate to require such studies only in the compelling circumstances described in the regulation. In determining which marketed products ''could pose significant risks to patients,'' FDA will consider such factors as the severity of the illness and the consequences of inadequate treatment, the number of pediatric prescriptions, and any available information on adverse events associated with use of the product.

FDA emphasizes that it intends to exercise its authority under § 201.23 only in compelling circumstances. FDA has estimated that it will require studies of approximately two marketed drugs per year.

FDA agrees that an expert panel can provide useful experience and guidance in developing a prioritized list of marketed drugs and biologics that meet the criteria for required studies. FDA intends to seek advice on developing such a list from a pediatric panel, as described in section III.M of this document (''Pediatric Committee'').

FDA also notes that FDAMA requires the agency to publish a list of marketed drugs for which ''additional pediatric information may produce health benefits in the pediatric population.'' FDA published this list within 180 days of the enactment of FDAMA, as required by that statute. Although the products on the list designated as high priority may be appropriate candidates for required studies under this rule, the list of high priority products is not necessarily exhaustive. Other products that might be subject to a requirement under this rule might not appear on the list. FDA also emphasizes that there is no implication that the agency will require studies of any particular product on the list. As noted in the Introduction to this preamble, before imposing any requirements under § 201.23, FDA intends to allow manufacturers eligible for FDAMA incentives an adequate opportunity to voluntarily conduct studies of marketed drugs in response to those incentives. If, following such an opportunity, there remain marketed drugs for which studies are needed and the compelling circumstances described in the rule are met, the agency will consider exercising its authority to require studies.

45. One comment claimed that the proposal requires studies only from manufacturers of innovator drugs (sponsors of the original application for the drug), while the major market share for many of these drugs is now held by generic manufacturers. This comment argued that a waiver should be granted if ANDA holders fail to share the costs of required studies. Another comment argued that the pediatric study requirement should apply only to the sponsor of the original application.

Where the agency requires pediatric studies on a multi-source marketed drug, each manufacturer of that drug, whether innovator or generic, will be responsible for satisfying the study requirement. To avoid duplication of research, FDA will encourage all the manufacturers to jointly fund an appropriate study. If, however, a joint study is not agreed to, each manufacturer will be responsible for submitting adequate studies.

K. Ethical Issues

In the proposal, FDA noted that because pediatric patients represent a vulnerable population, special protections are needed to protect their rights and to shield them from undue risk. To address ethical concerns in research on pediatric patients, both the AAP (Ref. 17) and the Department of Health and Human Services (DHHS), 45 CFR part 46, subpart D, have developed guidelines for the ethical conduct of clinical studies in pediatric patients. FDA advised in the proposal that sponsors should adhere to these guidelines for pediatric studies conducted under this rule. The agency also sought comment on ethical issues raised by the proposal.

46. A few comments addressed appropriate ethical guidelines for pediatric studies. Several comments said that existing ethical guidelines provide an adequate framework for pediatric studies. A comment from the AAP stated that ethical conduct should be guided by the DHHS and AAP guidelines, and that IRB approval that explicitly ensures protection of vulnerable subjects should be obtained. This comment also stated that the AAP guidelines provide a means to ensure ethical conduct of studies without impeding pediatric research. One comment said that DHHS ethics regulations may not provide sufficient protection for pediatric patients and suggested incorporating AAP guidelines for ethical conduct of pediatric studies into FDA's human subjects protections regulations. Another comment contended that pediatric studies should strictly adhere to regulations currently in effect for studies of human subjects who are unable to give consent, and urged FDA to further define requirements for investigation in vulnerable populations.

FDA believes that adherence to the DHHS and AAP guidelines will provide sufficient protection to pediatric patients from the risks of research. FDA will, however, seek advice from a panel of pediatric experts on whether additional protections are necessary.

47. Several comments addressed the ethics of requiring pediatric studies as described in the proposal. Two comments asserted that children are overmedicated and that administering drugs to children is unacceptable and ''ungodly.'' Comments from the pharmaceutical industry claimed that the rule as drafted would result in unethical testing of pediatric patients. One comment maintained that the regulations do not adequately protect pediatric patients from the risks of research because they impose a ''general rule that a deferral of testing in pediatrics will only be granted in narrow and limited circumstances.''

In contrast, comments from the pediatric community maintained that far more serious ethical concerns are raised by using untested drugs in pediatric patients than by conducting pediatric research. A comment from the AAP stated that there is no greater ethical dilemma than whether to give a drug with insufficient safety and effectiveness data to a child, or to withhold treatment and let the disease progress unabated.

Some comments suggested specific points in drug development at which pediatric testing becomes ethical. One comment argued that testing in pediatric patients before efficacy is demonstrated in adults may unnecessarily expose pediatric patients to a product's risks before its benefits are established. Another comment contended that it is unethical to begin studying drugs in pediatric patients that are not intended primarily for pediatric patients until the drug is adequately characterized in

adult patients, including choice of appropriate adult dose and establishment of reasonable evidence of safety and efficacy with an acceptable therapeutic margin. A pharmaceutical trade association argued that it is unethical to begin trials in pediatric patients until enough adult safety and effectiveness data have been gathered to conclude that the drug ''is likely to be approved for use in adults.''

FDA believes that some of the comments from the pharmaceutical industry misstate the application of the rule. As described fully previously, deferral of pediatric studies is specifically permitted in those cases where data should be collected in adults before exposing pediatric patients to the agent. There is no suggestion in either the proposed or final rule that deferral will be granted only in ''narrow and limited circumstances.'' FDA believes that, as drafted, the deferral provisions of the rule permit ethical pediatric testing that does not expose pediatric patients to inappropriate risks.

48. A few comments urged that placebo-controlled trials in pediatric patients be used rarely if at all. The AAP stated that placebo controls should not be used where that design would impose a substantial increase in risk to the child or would impede the ability to perform useful clinical trials. This comment urged that alternatives to placebo controls be used wherever possible and that where placebo controls are used, the study design should incorporate safeguards to avoid undue risk.

The question of appropriate control group arises only when there is a need for controlled trials to establish efficacy in the pediatric population. FDA agrees that alternatives to placebo-controlled trials should be used wherever they can provide sufficient information to establish effectiveness. FDA often accepts data from active control studies for certain therapeutic classes, such as anti-infectives and oncologic drugs. (See 21 CFR 314.126.) In some cases, new treatments can also be studied against a placebo together with a background of existing therapy, i.e., studied in ''add-on'' trials.

49. One comment argued that parents should not be given money or equivalent compensation for participation in drug studies. This comment suggested that any compensation could be put in the child's IRA.

The IRB overseeing a research study, rather than FDA, is responsible for determining whether compensation offered to the subjects of the study is ethically appropriate.

L. Remedies

If a manufacturer failed, in the time allowed, to submit adequate studies to evaluate pediatric safety and effectiveness required under proposed § 201.23(c) or § 314.55 (proposed § 314.50(g)), FDA proposed to consider the product misbranded under section 502 of the act or an unapproved new drug under section 505(a) of the act (see ''Legal Authority,'' in section IV of this document). Although proposed § 201.23 expressly covered both drugs and biologics, FDA inadvertently omitted in that section a reference to actions against biologics that have not obtained a license under section 351 of the Public Health Service Act. Such a reference has been added in the final rule. When a product is misbranded or an unapproved new drug, sections 302, 303, and 304 of the act (21 U.S.C. 332, 333, 334) authorize injunction, prosecution or seizure. FDA may also seek an injunction or bring a prosecution under the Public Health Service Act. In the proposal, FDA advised that it would bring an enforcement action for injunctive relief for failure to submit a required assessment of pediatric safety or effectiveness. Violation of the injunction would result in a contempt proceeding or such other penalties as the court ordered, e.g., fines. As noted in the proposal, FDA does not intend to deny or withdraw approval of a product for failure to conduct pediatric studies, except possibly in rare circumstances, because removal of a product from the marketplace could deprive other patients of the benefits of a useful medical product. Such circumstances might arise where the predominant use of the product was in pediatric patients rather than adults, and there were life-threatening risks associated with use of the product in pediatric patients when used without proper dosing and safety information in the labeling.

To assist FDA in determining whether pediatric assessments are needed or are being carried out with due diligence, FDA proposed to amend § 314.81(b)(2) (21 CFR 314.81(b)(2)) (annual postmarketing reports) to require that annual reports filed by the manufacturer contain information on labeling changes that have been initiated in response to new pediatric data, analysis of clinical data that have been gathered on pediatric use, assessment of data needed to ensure appropriate labeling for the pediatric population, and information on the status of ongoing pediatric studies. FDA also proposed to require that, where possible, the annual report contain an estimate of patient exposure to the drug product, with special reference to the pediatric population.

50. Several comments agreed with the agency that withdrawal or denial of approval is infeasible and supported the use of injunctive remedies. One comment argued that if FDA provides no incentives, disincentives to avoid pediatric trials must be strong, and that withdrawal and denial of approval must therefore be used as a remedy.

FDA continues to believe that refusal to approve or removal from the market is generally an unsatisfactory remedy from a public health perspective because it denies adequately studied populations access to safe and effective medicines.

51. Several comments supported the imposition of monetary fines. One comment urged that fines be imposed in the amount of a percentage of the profits to ensure that large and small companies had an equal disincentive. Several comments argued that fines should be used by FDA to fund pediatric studies carried out by government or private agencies. One comment contended that monetary penalties, such as fines or shortening of exclusivity, are the only practical remedy because industry and government are economically driven, but that injunctions are too costly.

Although FDA continues to believe that court-imposed fines are an appropriate remedy for failure to submit pediatric assessments, the agency has no authority itself to impose fines for violation of this rule, to set the amount of such fines, or to take the fines and direct them to specific activities.

52. Two comments opposed treating violative products as ''misbranded'' because this could limit access to the drugs or could delay availability of the products for adult use. According to one comment, FDA should consider a misbranding charge only if the sponsor failed to meet a phase 4 commitment. Another comment argued that injunction or prosecution are appropriate only as a final response, and that other, unspecified means are more efficient to elicit compliance. This comment also argued that seizure would serve only to deprive patients of safe and effective drugs.

The comments arguing that a misbranding charge could limit access or delay approval provided no basis for concluding that these results would occur, and FDA is aware of none. FDA agrees that injunction and prosecution are appropriate remedies only after the sponsor has been given an adequate opportunity to meet its obligations under the rule. FDA emphasizes, however, that providing adequate

pediatric labeling cannot be long-delayed without putting the health of pediatric patients at risk and that the agency will not accept unwarranted delays in submitting required studies. FDA also notes that it does not intend ordinarily to use seizure as a remedy for failure to conduct required studies.

53. Some comments offered additional or alternative remedies for failure to conduct required studies. One comment urged that failure to provide information to support pediatric labeling result in highly visible warnings on prescription and OTC labels that the drug has not been approved by FDA for pediatric use. Two comments argued that the label should disclose the status of pediatric studies, whether waivers or deferrals had been requested or granted, and the timetable for full compliance. Another comment contended that incentives are more effective than penalties, and that FDA discussions with sponsors during drug development will achieve the results sought in the proposal.

FDA agrees that publicity can sometimes be a useful tool for encouraging compliance. FDA does not believe, however, that it is feasible to include in labeling detailed information on the status of pediatric trials, because that information could change frequently. As described in section III.M of this document, FDA will, in appropriate cases, bring issues related to the progress of pediatric studies before a panel of pediatric experts, and may utilize other forms of publicity to provide the public with information about the status of required pediatric studies. FDA notes, e.g., that FDAMA contains provisions concerning disclosure of information on the status of postmarketing studies. FDA may also consider the use of prominent warnings about the absence of data on pediatric use, if necessary in particular cases.

M. Pediatric Committee

A large number of comments recommended that FDA form a panel of pediatric experts to provide advice on a range of topics related to implementation of this rule. Two comments recommended that an expert panel give advice on all facets of the rule. Several comments suggested more specific roles for the panel. For example, the AAP recommended that the panel provide advice on waiver requests, which marketed drugs require study, whether a drug is ''widely used,'' whether to accept a manufacturer's failure to develop a pediatric formulation, relevant age groups for study, the appropriateness of deferral, and appropriate timetables for completion of deferred studies. A disease-specific organization urged that a pediatric committee assist in establishing ''pediatric guidelines and practice,'' including a list of drugs for which studies would be required, protocol design, formulations, and age ranges. Two industry comments recommended that the panel review which drugs require testing and labeling, at what phase of drug development pediatric patients should be exposed, when waivers should be granted, what methods should be used to evaluate safety and effectiveness, the economic burdens on industry, and liability issues. Several comments, including comments from a pharmaceutical trade association, a disease-specific organization, a medical society, and pediatricians, recommended that the panel give advice on which drugs should be studied in pediatric patients. One comment suggested that FDA appoint a pediatric pharmacology expert to each of the existing drug advisory committees, except possibly the Fertility and Maternal Health Advisory Committee.

FDA has concluded that a panel of pediatric experts could provide useful advice and experience on several aspects of the implementation of the rule. FDA will therefore convene a panel of pediatric experts, including at least one industry representative, and seek its advice on a range of issues. Such a panel may be composed of pediatric experts appointed to each of FDA's existing drug advisory committees. As described in section III.E of this document under ''Waivers,'' FDA does not believe that it would be practical to ask such a committee to review every waiver or deferral request. However, the agency will ask the panel to provide annual oversight of the agency's implementation of the final rule, including the agency's record of granting or refusing waivers and deferrals. FDA will also seek the advice of the panel in identifying specific marketed drugs and biological products that should be studied in pediatric patients, and the age groups in which they should be studied. FDA will also ask for advice on assessing when additional therapeutic options are needed in treating specific diseases and conditions occurring in pediatric patients. As described previously, FDA will seek the panel's advice on ethical issues raised by clinical trials in pediatric patients, and whether additional rules should be implemented in this area. Where a manufacturer is not carrying out required studies according to the agreed upon timetable, FDA may seek the advice of the panel on whether the manufacturer is acting with due diligence. In addition, FDA may bring before the panel other issues that arise in the implementation of the rule, including the design of trials and analysis of data for specific products and classes of products.

N. Other Comments

54. Several comments suggested various forms of oversight for the implementation of the rule. One comment suggested that FDA establish a plan to prospectively evaluate these regulations, including their effect on the cost of drug development and on the time to new drug approval, and the number and success of pediatric studies actually performed. Another comment urged FDA to appoint a ''Children's Studies Ombudsman.'' One comment asked that the rule include an appeals mechanism to resolve disputes between sponsors and agency reviewers.

As described previously, FDA intends to convene a panel of pediatric experts, including at least one representative of the pharmaceutical industry, to, among other things, review the agency's implementation of the rule. FDA notes that it already has procedures for resolution of disputes between sponsors and FDA reviewing divisions, 21 CFR 312.48 and 314.103, and that these procedures will be available for disputes that arise under this rule.

55. Several comments contended that the rule is inconsistent with requirements in Canada, Europe, and Japan for pediatric studies. These comments argued that the rule was at odds with harmonization efforts and urged FDA to harmonize its requirements with those of other countries. One comment recommended that the United States, the European Union (EU), and Japan adopt pediatric drug development as a topic for global discussion and harmonization.

Although FDA is not required to harmonize its labeling regulations and enforcement with those of our International Conference on Harmonization (ICH) partners, harmonization is a goal that the agency strives to achieve. FDA intends to work through the ICH process to harmonize methods for conducting pediatric studies.

56. A few comments sought additional incentives for pediatric studies. One industry comment suggested that FDA should provide: (1) Priority reviews for applications containing pediatric data or ongoing studies; (2) waiver of user fees for pediatric effectiveness supplements; and (3) application of the subpart E

regulations (21 CFR part 312, subpart E) to pediatric development of new drugs and biological products, to address the issues associated with small sample size and therapeutic need.

Since the publication of the proposal, two significant new incentives have become available for pediatric research. First, as described elsewhere in this document, FDAMA provides 6 months of exclusive marketing to certain applicants who conduct pediatric studies. Second, as a result of changes made during the reauthorization of the PDUFA, user fees are no longer required for supplements that are solely for the purpose of adding a new indication for use in pediatric populations.

IV. Legal Authority

In the proposal, FDA cited as authority for the requirements in the rule sections 502(a), 502(f), 505(d)(7) of the act, and § 201.5 (21 CFR 201.5), which require adequate directions for use and prohibit false or misleading labeling; section 201(n) of the act, which defines as misleading labeling that fails to reveal material facts related to consequences of the customary or usual use of a drug; sections 201(p), 301(a) and (d) (21 U.S.C. 331(a) and (d)), and 505(a) of the act, which subject a drug to enforcement action if it is not recognized as safe and effective or approved for the conditions prescribed, recommended, or suggested in the labeling; section 502(j) of the act, which prohibits drugs that are dangerous to health when used in the manner suggested in their labeling; sections 505(i) and 505(k) of the act, which authorize FDA to impose conditions on the investigation of new drugs, including conditions related to the ethics of an investigation, and to require postmarketing reports; section 701(a) of the act, which authorizes FDA to issue regulations for the efficient enforcement of the act; and section 351 of the Public Health Service Act, which formerly required biological products to meet standards designed to insure their ''continued safety, purity, and potency.'' FDA notes that section 351 was amended by FDAMA, and now requires biological products to be ''safe, pure, and potent.''

FDA has authority under section 302 of the act and under the Public Health Service Act to seek an injunction requiring studies of certain marketed drugs on the grounds that the absence of pediatric safety and effectiveness information in the labeling renders the product misbranded or an unapproved new drug. The act also authorizes seizures of misbranded or unapproved drugs under section 304 of the act. Misbranding drugs and introducing unapproved new drugs into interstate commerce are prohibited acts under sections 301(a), (d), and (k) of the act. The statutory definition of ''drug'' is set out at section 201(g) of the act.

57. Several comments agreed that FDA has authority to require pediatric testing of drugs and biological products. One comment argued that the act already gives FDA the authority to require that all drugs be tested in pediatric patients, and that the rule, which permits waivers and deferred testing in some cases, weakens the agency's existing statutory authority. One comment contended a provision of FDAMA granting exclusivity to ''any pediatric study [that] is required pursuant to regulations promulgated by the Secretary [and that meets certain other requirements]'' shows that Congress agrees that FDA has authority to require pediatric studies. This comment also argued that, to the extent that FDA's position on its authority to require pediatric studies has changed, the change in position is justified because the proposal articulates a reasoned basis for the change.

FDA agrees that it has the authority to require pediatric testing of drugs and biologics. For the reasons cited in the preamble to the proposed and final rules, FDA has concluded that the requirements in the rule appropriately balance the need for adequate pediatric labeling and the limitations on resources available for pediatric testing and agency review. FDA also agrees that the reference in FDAMA, which was enacted after the proposal was issued, to pediatric studies required by FDA, demonstrate that Congress is aware of FDA's position that it has the authority to issue this rule and agrees that the agency has such authority. Finally, FDA agrees that it has articulated a reasoned basis for its position that the agency has authority to require pediatric studies, but notes that FDA previously stated its position that it has the authority to require pediatric studies in 1994 (59 FR 64240 at 64243).

58. Several comments argued that FDA lacks authority to require pediatric studies of drugs. A few comments cited remarks by former Commissioner David Kessler during a 1992 speech. In that speech, David Kessler stated his opinion that FDA does not have ''the authority to require manufacturers to seek approval for indications which they have not studied.'' Other comments argued that FDA has no authority to require the study of any indications or populations other than those proposed by the manufacturer. One comment challenged FDA's reliance on section 201(n) of the act for not-yet-approved drugs, claiming that the agency cannot know what will be the ''customary or usual uses'' of an unmarketed drug. A few comments argued that the agency's legal theory would authorize the agency to require studies of all off-label indications.

FDA disagrees that any of these arguments show that FDA lacks authority to issue this rule. Under FDA's longstanding policy, statements made in speeches, even by Commissioners, are informal expressions of opinion and do not constitute a formal agency position on a matter. As such they are not binding on the agency. (See, e.g., 21 CFR 10.85(k).)

FDA also disagrees that it has no authority to require a drug or biologic to be studied in a population that is expected to use the product for the claimed indication, or that this is a new position. The agency has repeatedly stated that an application for marketing approval should contain data on a reasonable sample of the patients likely to be given the product once it is marketed (59 FR 64240 at 64243; 58 FR 39406 at 39409). The agency has also previously asserted its authority to require studies in pediatric patients and in other subpopulations for both not-yet-approved products and marketed products. In the preamble to the 1994 rule, FDA made the following statement:

> If FDA concludes that a particular drug is widely used, represents a safety hazard, or is therapeutically important in the pediatric populations, and the drug sponsor has not submitted any pediatric use information, then the agency may require that the sponsor develop and/or submit pediatric use information.
>
> If FDA has made a specific request for the submission of pediatric use information because of expected or identified pediatric use, and the sponsor fails to provide such information, the agency may consider the product to be a misbranded drug under section 502 of the act, or a falsely labeled biological product under section 351 of the PHS Act, as an unapproved new drug or unlicensed biological product. (See 21 U.S.C. 355 and 42 U.S.C. 262.)
>
> (59 FR 64240 at 64248; see also 58 FR 39406 at 39409)

The act and implementing regulations require drugs to be adequately labeled for their intended uses. See sections 502(f) of the act and § 201.5. ''Intended uses'' encompass more than the uses explicitly included in the manufacturer's proposed labeling. *Id.*, 21 CFR 201.128. In determining the intended uses of a drug for which it must be adequately labeled, FDA may consider both the uses for which it is expressly labeled and those for which the drug is commonly used, § 201.5.

FDA may also consider the actual uses of the drug of which the manufacturer has, or should have, notice, even if those uses are not promoted by the manufacturer, 21 CFR 201.128. Section 201(n) of the act defines labeling as misleading if it fails to include material facts about the consequences of ''use of the [drug] * * * under such conditions of use as are customary or usual.'' Sections 201(p) and 505(d) of the act authorize FDA to require evidence establishing the safety and effectiveness of uses ''suggested'' by the manufacturer's labeling as well as those expressly recommended in the labeling. Thus, the agency has authority to require a manufacturer to establish the safety and effectiveness of, and adequately label its product for, use of the product in a subpopulation for which the product is not labeled if that use is common or suggested in the labeling.

As described in the proposal, there is extensive evidence that drugs and biologics indicated for diseases that affect both adults and pediatric patients are routinely used in pediatric patients despite the absence of pediatric labeling, and even in the face of disclaimers stating that safety and effectiveness have not been established in pediatric patients. FDA may therefore consider pediatric use to be ''customary or usual'' or ''commonly used'' where the drug is indicated for a disease or condition that affects both adults and children, and the drug is not contraindicated in pediatric patients. FDA may also consider pediatric use to be ''suggested'' in a drug's labeling even where such use is not expressly recommended or is even disclaimed. The medical community generally expects that drugs and biological products will behave similarly in demographic subgroups, including age and gender subgroups, even though there may be variations among the subgroups, based on, e.g., differences in pharmacokinetics. Thus, where a drug or biological product is indicated for a disease suffered equally by men, women, and children, and is not contraindicated in women or pediatric patients, the product will be widely prescribed for all three subgroups even if it were studied only in, or labeled only for, men.

FDA disagrees that it can know nothing, in advance of marketing, about whether a drug or biological product will be used in pediatric patients. The evidence cited in the proposal and confirmed by comments from the pediatric community is overwhelming that products indicated for diseases that affect both adults and children are and will be commonly used in pediatric patients. Indeed, pediatricians often have no choice but to use these products in pediatric patients. A drug product that provides a meaningful therapeutic benefit either because it represents a significant improvement in therapy or because it is a necessary therapeutic option can be expected to be routinely used in the treatment of pediatric patients. Under the rule, the decision that a product will provide a meaningful therapeutic benefit or will be used in a substantial number of pediatric patients is made on a case-by-case basis, depending upon such factors as the number of pediatric patients affected by the disease for which the product is indicated, the availability and adequacy of other therapeutic options to treat pediatric patients for the disease, and whether similar products, e.g., products in the same drug class, have been widely used in pediatric patients.

Finally, FDA emphasizes that this rule applies only where a product is expected to have clinically significant use in pediatric populations for the indications already claimed by the manufacturer. The record before the agency documents widespread evidence of actual use of products in the pediatric population for indications labeled for adults. This record supports FDA's conclusion that it has authority to require pediatric studies of drugs and biologics that have or are expected to have clinically significant use among pediatric patients for the claimed indications. The agency has not examined evidence concerning the use of approved products for diseases or conditions not in the label, and the rule does not apply in those situations.

59. Two comments addressed the agency's reliance on section 701(a) of the act. One comment argued that 701(a) of the act, in combination with the substantive statutory provisions cited by FDA, authorizes this rule because the agency has demonstrated that the rule is reasonably related to the purposes of the act. Another comment argued that 701(a) of the act does not authorize the agency to enforce requirements beyond those imposed by the act.

Section 701(a) of the act gives the Secretary authority to issue regulations for the efficient enforcement of the act. Consonant with the Supreme Court's determination that the language of the act should not be read restrictively, but in a manner consistent with the act's purpose of protecting the public health, a regulation issued under section 701(a) of the act will be sustained so long as it is reasonably related to the purposes of the act. *United States* v. *Nova Scotia Food Products Corp.*, 568 F.2d 240, 246 (2nd Cir. 1977). FDA believes that it has demonstrated that this regulation is reasonably related to the purposes of the act.

V. Implementation Plan

FDA proposed that the rule would become effective 90 days after the date of its publication in the **Federal Register**. For new drug and biologic product applications submitted before the effective date of the final rule, the agency proposed a compliance date of 21 months after the effective date of the final rule (for a total of 2 years after issuance of the final rule). For new drug and biologic product applications submitted on or after the effective date of the final rule, the agency proposed a compliance date of 15 months after the effective date of the final rule (for a total of 18 months after issuance of the final rule). FDA has revised the final rule to become effective 120 days after publication in the **Federal Register**, to allow additional time for comment on the revised information collection requirements. FDA has also revised the compliance dates. All applications will have a compliance date of 20 months after the effective date of the rule (for a total of 2 years after publication of the final rule).

60. Two industry comments argued that the proposed effective dates were too short. One of these suggested that 15 and 21 months were too short to develop a pediatric program and formulation, conduct trials, analyze data, and submit an application. Two comments asked that FDA clarify what ''compliance'' means. According to one of these comments, 15 months would be adequate for initiation of discussions with a sponsor about plans, but inadequate for completion of studies. This comment also argued that it is not in children's interest to rush through pediatric studies to meet an arbitrary deadline. Another comment offered the example of Ritonavir, a drug to treat HIV infection, for which pediatric studies reportedly took 21 months even after development of a pediatric formulation. According to the comment, it took 15 months to agree on a protocol, 3 months to recruit patients, and 3 months to the first interim analysis of data. One disease-specific organization argued that the effective dates were too long. This comment proposed 12 months from the effective date of final rule, which could be extended by 6 months if genuine difficulties occurred. This comment also urged that compliance with the early discussion requirements be immediate. One comment argued that pending applications should be granted a full

waiver and treated as marketed products.

''Compliance,'' as referred to in the proposal, means the submission of an assessment of pediatric safety and effectiveness under § 314.55(a) (proposed § 314.50(g)(1) or 601.27(a)), unless a waiver or deferral for all relevant age groups has been granted. FDA has reconsidered the compliance dates and has concluded that applications submitted on or after the effective date of the final rule should be given 20 months from the effective date of the final rule to achieve compliance. Although FDA does not believe that development of, and agreement on, a protocol should take 15 months, protocol development, recruitment, enrollment, and data analysis may together take up to 2 years. There is no reasonable basis on which to distinguish between an application submitted 1 day before the effective date of the final rule, and one submitted a day later.

All other provisions of the rule will become effective on the effective date of the rule. One hundred twenty days from the date of publication in the **Federal Register** is sufficient time to meet these new requirements.

VI. Paperwork Reduction Act of 1995

This final rule contains information collection requirements that are subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (the PRA) (44 U.S.C. 3501–3520). The title, description, and respondent description of the information collection requirements are shown below with an estimate of the annual reporting burden. Included in the estimate is the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing each collection of information.

With respect to the following collection of information, FDA invited comment on: (1) Whether the proposed collection of information is necessary for proper performance of FDA's functions, including whether the information will have practical utility; (2) the accuracy of FDA's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (3) ways to enhance the quality, utility, and clarity of the information to be collected; and (4) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques, when appropriate, and other forms of information technology.

OMB filed a Notice of Action, not approving the proposed collection of information. OMB requested that, as part of the final rule, FDA address all comments received on the information collection requirements contained in the rule, particularly with respect to the reporting burden imposed by the rule. FDA received one comment concerning the proposed burden estimates of this rulemaking under the PRA. The comment contended that FDA underestimated the time required to comply with the annual reporting requirements of the proposed rulemaking.

The agency received several comments that questioned the accuracy of FDA's estimate of the burden of the proposed collection of information as being too low and requested changes. For example, one comment requested changes in the burden estimate for manufacturers requesting deferrals of submission of pediatric data as well as the estimate for manufacturers to submit pediatric information in their annual report. In addition, the estimate for manufacturers to submit in their annual reports the analysis of available safety and efficacy data conducted or obtained in the pediatric population as well as proposed labeling was questioned. Based on these comments the agency increased the proposed burden estimates. These issues are discussed in more detail in the preamble to the final rule.

Concerning § 314.50(d)(7), the comment stated that in order to comply with this requirement, ''one company'' estimated that, for one pediatric reporting project, medical staff had spent at least 118 hours, rather than the 8 hours that FDA had estimated, reviewing the medical literature and summarizing the findings. FDA does not believe that this comparison is fully appropriate because § 314.50(d)(7) does not require an applicant to review the medical literature, or other studies, *de novo*. It simply requires an applicant to provide a brief summary of data that have already been fully reported and analyzed elsewhere in the same application. However, because the data to be summarized may be more extensive than originally estimated, FDA has, in response to the comment, increased its estimate of the reporting burden for this requirement from 8 hours to 50 hours.

Concerning § 314.55(a), the comment contended that FDA's estimate of 10 companies submitting NDA's annually for NME's is too low. The comment implied that, based on data for 1996, 50 companies would be a more realistic estimate. The comment also contended that FDA's estimate of 16 hours for a manufacturer to prepare the report of the data supporting the safety and effectiveness of the drug for the indication for the pediatric population is too low. In response to this comment, FDA has revised its burden estimate from 16 to 48 hours. FDA has also made a corresponding change in the estimate for § 601.27(a). FDA has revised the estimate of the number of companies affected from 10 to 51 to reflect the broader scope of the rule.

Concerning § 314.55(b), the comment stated that FDA's estimate of 9 manufacturers requesting deferrals of the submission of pediatric study data and the estimate that this would take 8 hours to complete are too low. In response to this comment, FDA has revised its burden estimate from 8 hours to 24 hours. FDA has also made a corresponding change in the estimate for § 601.27(b). FDA has revised the estimate of the number of companies affected from 8 to 51 to respond to the comment and to reflect the broader scope of the rule.

Concerning § 314.81(b)(2)(i), the comment contended that FDA's estimate of 1.5 hours for manufacturers to submit pediatric information in their annual reports is too low. In response to this comment, FDA has revised its burden estimate from 1.5 hours to 8 hours and has made a corresponding change in its estimate for § 601.27(c).

Concerning § 314.81(b)(2)(vi)(*c*), the comment contended that FDA's estimate of 1.5 hours for manufacturers to submit in their annual reports the analysis of available safety and efficacy data conducted or obtained in the pediatric population as well as proposed labeling changes is too low. The comment stated that even an estimate of 15 hours would be too low. Although the comment did not provide an estimate of the hours required to satisfy § 314.81(b)(2)(i) and (b)(2)(vi)(*c*), FDA has increased its estimates to 8 and 24 hours, respectively.

Based upon these comments, FDA has decided to increase the agency's proposed burden estimates. These revisions are reflected in the Table 2 of this document. In addition, the burden estimates for §§ 314.55(a), (b), and (c), and 601.27(a), (b), and (c), have increased because of the new requirements in the final rule to include, in addition to applications for new chemical entities and never-before-approved biologics, applications for new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration. These estimates are based upon FDA's analysis of all marketing applications and efficacy

supplements approved over the 5-year period of 1993 to 1997 and those that would likely have needed additional pediatric data had this rule been in effect by 1993 (see ''Analysis of Impacts,'' in section VIII of this document). In addition, burden estimates have been added in Table 2 of this document for the new requirements in the final rule concerning submissions for end-of-phase 1 and end-of-phase 2 meetings under § 312.47(b)(1)(iv) and submissions for pre-NDA meetings under § 312.47(b)(2). These estimates are based on FDA's records of the number of these meetings held during 1997. Finally, burden estimates have been added for new postmarket report requirements added for biological products under § 601.37 (a), (b), and (c), corresponding to § 314.81 (b)(2)(i), (b)(2)(vi)(*c*), and (b)(2)(vii). These estimates are based upon FDA's records of the number of licensed biological products.

Title: Regulations Requiring Manufacturers to Assess the Safety and Effectiveness of New Drugs and Biological Products in Pediatric Patients.

Description: This final rule includes the following reporting requirements: (1) Reports on planned pediatric studies in IND's (§ 312.23(a)(10)(iii)); (2) Reports for end-of-phase 1 and end-of-phase 2 meetings (§ 312.47(b)(1)(iv)) and reports for pre-NDA meetings (§ 312.47(b)(2)); (3) Summaries of data on pediatric safety and effectiveness in NDA's (§ 314.50(d)(7)); (4) Reports assessing the safety and effectiveness of certain drugs and biological products for pediatric use in NDA's and BLA's or in supplemental applications (§§ 314.55(a) and 601.27(a)); (5) Requests seeking deferral of required pediatric studies (§§ 314.55(b) and 601.27(b)); (6) Requests seeking waiver of required pediatric studies (§§ 314.55(c) and 601.27(c)); (7) Postmarketing reports of analyses of data on pediatric safety and effectiveness (§§ 314.81(b)(2)(vi)(*c*) and 601.37(a)(1)); (8) Postmarketing reports on patient exposure to certain marketed drug products (§§ 314.81(b)(2)(i) and 601.37(a)(2)); (9) Postmarketing reports on labeling changes initiated in response to new pediatric data (§§ 314.81(b)(2)(vi)(*c*) and 601.37(a)(3)); and (10) Postmarketing reports on the status of required postapproval studies in pediatric patients (§§ 314.81(b)(2)(vii) and 601.37). The purpose of these reporting requirements is to address the lack of adequate pediatric labeling of drugs and biological products by requiring the submission of evidence on pediatric safety and effectiveness for products with clinically significant use in children.

Description of Respondents: Sponsors and manufacturers of drugs and biological products.

TABLE 2.—ESTIMATED ANNUAL REPORTING BURDEN [1]

21 CFR section	No. of respondents	Annual frequency per response	Total annual responses	Hours per response	Total hours
201.23	2	1	2	48	96
312.47(b)(1)(iv)	27	1.2	32	16	512
312.47(b)(2)	36	1.3	46	16	736
314.50(d)(7)	213	1	213	50	10,650
314.55(a)	51	1	51	48	2,448
314.55(b)	51	1	51	24	1,224
314.55(c)	176	1	176	8	1,408
314.81(b)(2)(i)	625	1	625	8	5,000
314.81(b)(2)(vi)(*c*)	625	1	625	24	15,000
314.81(b)(2)(vii)	625	1	625	1.5	937.5
601.27(a)	2	1	3	48	144
601.27(b)	2	1	3	24	72
601.27(c)	3	1	4	8	32
601.37(a)	69	1	69	8	552
601.37(b)	69	1	69	24	1,656
601.37(c)	69	1	69	1.5	103.5
Total					40,571

[1]There are no capital or operating and maintenance costs associated with this collection of information.

The information collection provisions of this final rule have been submitted to OMB for review. Prior to the effective date of this final rule, FDA will publish a notice in the **Federal Register** announcing OMB's decision to approve, modify, or disapprove the information collection provisions in this final rule. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

VII. Environmental Impact

The agency has determined under 21 CFR 25.30(h) that this action is of a type that does not individually or cumulatively have a significant effect on the human environment. Therefore, neither an environmental assessment nor an environmental impact statement is required.

VIII. Analysis of Impacts

A. Introduction and Summary

FDA has examined the impacts of the final rule under Executive Order 12866, the Regulatory Flexibility Act (5 U.S.C. 601–612), and the Unfunded Mandates Reform Act (Pub. L. 104–4). Executive Order 12866 directs agencies to assess all costs and benefits of available regulatory alternatives and, when regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity). Under the Regulatory Flexibility Act, unless an agency certifies that a rule will not have a significant economic impact on a substantial number of small entities, the agency must analyze regulatory options that would minimize the impact of the rule on small entities. The Unfunded Mandates Reform Act (Pub. L. 104–4) (in section 202) requires that agencies prepare an assessment of anticipated costs and benefits before proposing any rule that may result in an expenditure by State, local, and tribal governments,

in the aggregate, or by the private sector, of $100 million or more in any one year (adjusted annually for inflation).

The agency has reviewed this final rule and has determined that the rule is consistent with the regulatory philosophy and principles identified in Executive Order 12866, and in these two statutes. This rule is an economically significant regulatory action, because of its substantial benefits. It is also a significant regulatory action as defined by the Executive Order due to the novel policy issues it raises. With respect to the Regulatory Flexibility Act, the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Since the rule does not impose any mandates on State, local, or tribal governments, or the private sector that will result in an expenditure of $100 million or more in any one year, FDA is not required to perform a cost-benefit analysis according to the Unfunded Mandates Reform Act.

FDA is requiring that a limited class of important new drugs and biologicals that are likely to be used in pediatric patients contain sufficient data and information to support directions for this use. As the approved labeling for many of these new products lacks adequate pediatric information, their use in children greatly increases the risk of inappropriate dosing, unexpected adverse effects, and suboptimal therapeutic outcomes. This rule is designed to ensure that new drugs, including biological drugs, that are therapeutically important and/or likely to be used in a substantial number of children contain adequate pediatric labeling at the time of, or soon after, approval.

The agency estimated the costs to industry of the required new pediatric studies by first determining what the annual costs would have been in 1993 to 1997, had the rule become effective in 1993. The methodology included: (1) Constructing a data base of all 583 NDA's and efficacy supplements approved by the agency over that 5-year period for drugs and biologicals likely to produce health benefits in the pediatric population, (2) determining which of those applications would have been required to conduct additional pediatric studies, (3) calculating how many unapproved and already marketed drugs and biologicals would have needed additional pediatric studies, and (4) estimating the size and cost of the additional studies. The analysis indicated that, on average, this regulation would have required an estimated 378 additional pediatric studies on about 82 drugs and biologicals per year. These studies would have involved a total of 10,860 pediatric patients, 7,408 in efficacy studies, and 3,452 in PK studies. In addition, an estimated 33 of the 82 drugs and biologicals needing new pediatric data each year may have needed new pediatric dosage forms. FDA judges that the additional studies would have cost about $45 million and the new dosage formulations about $33 million annually, for a total annual cost of almost $80 million. The agency found, however, that roughly 42 percent of the costs of the studies would have been spent voluntarily had the extended pediatric exclusivity provisions of the recent FDAMA statute been in place. Adjusting for this effect lowers the agency's final cost estimate for this rule to about $46.7 million per year.

FDA could not develop a quantifiable estimate of the benefits of this regulation, although numerous anecdotal examples illustrate the current health problem. To consider some of the potential benefits, the agency examined hospitalization rates for five serious illness (asthma, HIV/AIDS, cancer, pneumonia, and kidney infections) and found significantly higher rates for children than for middle-aged adults. Although FDA can not estimate the extent to which these differentials reflect the relative lack of pharmaceutical safety and efficacy information for pediatric compared to adult use, the agency calculated that a 25 percent reduction in these differentials would lead to direct medical cost savings of $228 million per year. FDA also estimates that about two-thirds of the approved applications needing pediatric studies will be addressed by the incentives established by FDAMA. If the estimated medical cost savings were adjusted by a similar ratio, the analysis suggests that a 25 percent reduction in the pediatric/adult hospitalization rate differentials would yield annual savings of $76 million for these five illnesses.

B. Number of Affected Products and Required Studies

In the preamble to its proposal, FDA explained that neither the precise number of drugs that would require additional pediatric studies nor the cost of these studies could be predicted with certainty. To develop plausible estimates of the number of new drugs and biologicals that would be affected, the agency had examined the pediatric labeling status at time of approval for each NME and important biological approved from 1991 to 1995, and used these estimates to project the number of drugs that would have required additional pediatric data had the proposal been in place over that period.

Several industry comments declared that FDA's analysis of the proposal substantially underestimated the economic impact by understating both the number and size of the studies that would be required. Only two of the comments, however, included alternative estimates. One suggested that each new drug could require the testing of 300 or more pediatric patients for safety data alone. The other comment estimated that, ''each new drug studied would probably require a minimum of six clinical trials (two each in Phases I, II, and III), for one indication and one formulation.'' This comment explained that Phase I trials would include 20 patients, Phase II trials 50 patients, and Phase III trials 100 patients. Assuming two trials for each phase, the comment projected that 34,000 pediatric patients would need to be studied each year (170 patients x 2 trials x 100 drugs).

FDA agrees that some applications will require data from a substantial number of pediatric patients. The agency believes, however, that most studies will not include large numbers of pediatric patients. For example, FDA does not necessarily require two pediatric studies for each trial phase. Moreover, FDA's 1994 final rule (59 FR 64240) explains that extrapolations from adult effectiveness data based on PK studies and other safety data can be sufficient to provide the necessary pediatric dosing information for those drugs and biologicals that work by similar mechanisms in adults and children. The agency expects that the majority of the studies will rely, to some extent, on such extrapolations.

On the other hand, the proposal primarily addressed drugs and biologicals that contained no previously approved active moiety. The final rule requires pediatric data for new active ingredients, new indications, new dosage forms, new dosing regimens, and new routes of administration that represent a meaningful clinical benefit over existing treatments for children, or that are likely to be widely used in children. The rule also requires pediatric studies for marketed drugs and biologicals that are already widely used among children for the claimed indications, if the absence of adequate labeling could pose significant risks; or if the drug would provide a meaningful clinical benefit over existing treatments for pediatric patients, but additional dosing or safety information is needed to permit their safe and effective use in children.

To develop a revised estimate of the number of drugs and biologicals that

would require additional pediatric data, FDA constructed a data base of all 583 applications and efficacy supplements approved over the 5-year period from 1993 to 1997 for drugs and biologicals for which pediatric labeling would be likely to provide a significant health benefit. The selected drugs and biologicals included all those for which the active moiety was listed in the priority section in the **Federal Register** of May 20, 1998 (63 FR 27733), document entitled ''List of Drugs For Which Additional Pediatric Information May Produce Health Benefits in the Pediatric Population'' (''List''). Mandated by FDAMA, this publication includes the agency's priority list of drugs and biologicals that would likely provide a significant benefit to the pediatric population. The selection criteria used to prepare this priority list were almost identical to those set forth in this final rule, i.e.,

- The drug product, if approved for use in the pediatric population, would be a significant improvement compared to marketed products labeled for use in the treatment, diagnosis, or prevention of a disease in the relevant pediatric population (i.e., a pediatric priority drug); or,
- The drug is widely used in the pediatric population, as measured by at least 50,000 prescription mentions per year; or,
- The drug is in a class or for an indication for which additional therapeutic options for the pediatric population are needed.

FDA then identified each of the 583 applications that would likely have needed additional pediatric studies had this rule been in effect. The number and type of studies needed were projected based on specific decision rules derived from agency experience in reviewing drug applications and developed strictly for the purpose of estimating the regulatory costs of this rule. Although in practice, these rules would have been subject to numerous exceptions, in the aggregate, FDA believes that they provide plausible estimates of the total number and type of pediatric studies that would have been required. The decision rules were as follows:

1. All New Chemical Entities (NCE's) and biologicals were assumed to need both an efficacy study and a PK study for each age group identified in the priority section of the ''List'' as needing pediatric information, although FDA believes that this assumption overstates the true number of efficacy studies that will be needed.

2. For the following categories of applications, both an efficacy and a PK study were assumed for each designated age group. Again, FDA believes that this assumption may overstate the true number of efficacy studies that will be needed:

Neurological drugs;
Oncology drugs;
Nausea agents;
Pulmonary agents;
NSAIDs—arthritis/pain;
AIDS/HIV agents;
Asthma drugs;
Anesthesia drugs;
Hormones;
Dermatological agents;
Acne agents

3. A PK study alone was assumed sufficient for each relevant age group for the following types of non-NCE applications:

Allergies;
Infectious diseases;
Cardiovascular diseases;
Imaging agents;
Hematology agents;
GI disorders;
Urologic drugs

4. If pediatric labeling was already adequate as the result of an approved application, additional applications for new dosage forms were assumed to be exempt.

5. If a second applicant sought approval for the same indication of the same drug as a previous applicant that had already satisfied the pediatric labeling requirements, the second applicant was considered exempt from the pediatric labeling requirement.

6. Because the regulation imposes requirements only on new NDA's or efficacy supplements that specifically address an indication needing pediatric data, no pediatric requirements were assumed for an NDA supplement submitted for a new indication not identified as needing pediatric data.

7. Orphan drugs were excluded from additional research requirements.

The results of this analysis (see Table 3 of this document) show that about 44 percent, or an estimated 255, of the total 583 drug and biological applications for the products on the priority section of the ''List'' drugs approved over the 5-year period would have required additional pediatric studies, had the rule been in effect starting in 1993. Assuming separate studies for each pediatric age group specified in the ''List,'' indicates that an estimated 459 efficacy studies and 713 PK studies would have been required for these applications.

These estimates understate the required research effort, however, because they omit pediatric studies for drugs that fail to gain approval. It is difficult to judge how much additional pediatric research would be directed towards nonapprovable products. The agency notes, however, that because only about 63.5 percent of all NME's that enter phase III trials are eventually approved (Ref. 18), the number of drugs entering phase III trials is about 58 percent greater than the number of actual approvals (100/63.5 = 1.58). Moreover, there are two additional complications. First, under the rule, FDA expects to defer for several years the conduct of pediatric studies of ''me-too'' drugs that do not offer a meaningful therapeutic benefit and that are members of a drug class that already contains an adequate number of approved products with pediatric labeling. No additional pediatric studies would be expected for this group of never approved drugs. On the other hand, applications for ''lifesaving'' drugs may need to begin pediatric trials by the start of Phase II. On the assumption that these two factors would roughly offset, FDA has retained the 58 percent figure as a reasonable adjustment factor to account for the number of studies conducted for drugs that fail to gain approval. Finally, each year, the agency expects to identify about two ''already marketed'' drugs that require additional pediatric efficacy data.

As shown in Table 4 of this document, adjusting for the ''never approved'' and the ''already marketed'' applications implies that, had this rule become effective in 1993, about 1,892 new pediatric studies would have been required over the 1993 to 1997 period. About 740 of the studies would have been efficacy studies and 1,151 PK studies. Thus, on average, each year, the rule would have required about 378 new pediatric studies for about 82 NDA's and or NDA supplements—148 efficacy studies and 230 PK studies.

TABLE 3.—APPROVED NEW DRUG APPLICATIONS AND THEIR SUPPLEMENTS FROM 1993 TO 1997

Approval year	Applications for "List" Drugs	Applications needing pediatric studies	Efficacy studies required	PK studies required	Total studies required	New dosage forms
1993	77	43	63	122	185	12
1994	76	42	74	118	192	17
1995	107	38	69	107	176	13
1996	177	74	147	213	360	29
1997	146	58	106	153	259	19
Total	583	255	459	713	1,172	90
Average	117	51	92	143	234	18

TABLE 4.—ALL NEW DRUG APPLICATIONS AND THEIR SUPPLEMENTS FROM 1993 TO 1997 [1]

Approval year	Applications for "List" Drugs [2]	Applications needing pediatric studies	Efficacy studies required	PK studies required	Total studies required	New dosage forms
1993	124	69	102	197	299	22
1994	123	68	119	190	310	32
1995	173	61	111	173	284	24
1996	286	119	237	344	581	54
1997	236	94	171	247	418	35
Total	942	411	740	1,151	1,892	167
Average	188	82	148	230	378	33

[1] Includes estimates for "unapproved" and "already marketed" drugs.
[2] Adjusted for "unapproved" and "already marketed" drugs.

C. Number of Pediatric Patients

The number of pediatric patients needed varies with the particular type of drug studied. However, based on agency experience, FDA estimates that, for each pediatric age group studied, typical pediatric PK studies may involve about 15 patients and typical efficacy studies about 50 patients. For example, if 2 of the 4 age groups lack PK studies, FDA assumed that a total of 30 subjects would be needed for the studies. If 3 of the 4 age groups lack efficacy studies, a total of 150 subjects were assumed to be needed in all 3 age groups. These assumptions indicate that, had this rule become effective in 1993, each year, about 82 NDA's would have required additional pediatric studies; 7,408 pediatric patients in efficacy studies and 3,452 pediatric patients in PK studies, for an annual total of about 10,860 pediatric patients.

D. Costs of Compliance

1. Cost of Pediatric Studies

FDA's analysis of the proposal assumed that new studies would cost pharmaceutical firms from $5,000 to $9,000 per pediatric patient. Only one comment, that of a large U.S. pharmaceutical company, submitted actual estimates of the cost of conducting pediatric trials. This comment stated that a PK or bioavailability/bioeqivalency study of 20 patients would cost at least $100,000, a Phase II trial of 50 patients would cost a minimum of $150,000, and a Phase III trial of 100 patients would cost $200,000. For its revised analysis, therefore, FDA assumes that a PK study of 15 patients will cost $100,000 per affected age group and that an efficacy study of 50 patients will cost $150,000 per affected age group. Although a few trials may need to be larger and, thus more expensive; others will require substantially fewer pediatric patients. Thus, FDA believes these figures reasonably project the average added costs.

As FDA estimates that the regulation would have required pharmaceutical companies to annually conduct an estimated 378 additional pediatric studies for 82 NDA's, 148 efficacy studies, and 230 PK studies; the above unit cost estimates imply total industry costs of $45 million annually. Although the industry comment that included the cost data projected clinical trial costs totaling over $100 million per year, this estimate assumed the need for 34,000 additional pediatric patients. FDA found that had this rule been in place over the 1993 to 1997 period, it would have required additional data from about 10,860 patients per year.

2. Cost of New Formulations

In its earlier analysis of the proposal, FDA calculated that about 30 percent of all NME's were available only in tablets or hard capsules at the time of approval. Acknowledging the potential difficulties of developing new formulations for certain drugs, FDA estimated that the overall costs could average $1 million for each new formulation developed. Several comments questioned the agency's estimates. Based on an informal survey of its members, a major industry trade association reported that the development of a pediatric formulation could take from 5 months to 4 years and cost from $500,000 to $3.5 million. It also objected to the agency's estimate of the number of drugs that would require reformulation. The association, however, apparently misunderstood FDA's methodology. The agency had found that 10 of 14 drugs per year would not need reformulation because a potentially adequate dosage form (liquid, an injectable, a solution, a dermatological, etc.) was already available. The association believed that FDA has assumed that only tablets and/or capsules were available for the ten drugs. None of these comments,

however, offered an alternative methodology for projecting the aggregate value of these costs.

To develop reasonable estimates of the number of new dosage forms that would be needed, FDA again reviewed all of the 255 approved drug applications that would likely have required new pediatric studies during the 1993 to 1997 period, had this rule been in place. The agency generally assumed that those drugs identified as having a meaningful clinical pediatric benefit for the youngest three age groups, but available only in tablets or hard capsules at the time of approval, would have needed to develop an alternative dosage form. The agency also assumed that a new pediatric formulation would not be counted if a more appropriate pediatric dosage form was subsequently approved for the same drug. FDA is aware that these estimates can not be considered precise. For example, not all liquids are adequate for pediatric populations. On the other hand, new formulations may not be needed if a drug is used primarily for children between the ages of 8 and 12 years. Nevertheless, as shown in Table 3 of this document, the results of this methodology show that about 35 percent of the approved applications needing studies, or about 18 per year, would have needed new dosage forms. Table 4 of this document raises this estimate by 83 percent, or to 33 per year, to account for the number of new dosage forms developed for drugs not subsequently approved. While FDA cannot confidently predict a typical initiation time for this effort, the 83 percent adjustment calculation assumes that work on about 25 percent of all new formulations would be initiated at the start of Phase 2 trials and 75 percent by the start of Phase 3 trials. (The probability of approval was assumed to be .635 for a drug entering phase 3 trials and .31 for a drug entering phase 2 trials (Ref. 18).)

The development of some pediatric formulations will be difficult, the development of others relatively straightforward and achieved without substantial problem. The rule requires only that sponsors take all reasonable steps to develop needed new formulations. Thus, while acknowledging that the cost for particularly difficult formulations may be higher, FDA has retained its average cost estimate of $1 million to develop each new dosage form and projects this total industry cost at nearly $33 million per year.

3. Cost of Added Paperwork Requirements

The rule also requires additional industry effort for new or expanded paperwork reporting. Section VI of this document describes these reporting tasks, discusses the industry comment that questioned the agency's estimate of the paperwork burden for the proposal, and presents the agencies revised estimate for this final rule. As shown in that section, FDA projects an annual burden of about 40,000 hours per year. On the assumption that 25 percent of these hours will be for upper management staff, 50 percent for middle management staff, and 25 percent for administrative and clerical support, at respective labor costs of $52, $34, and $17 per hour, FDA estimates these total paperwork costs at about $1.4 million per year.

4. Total Costs

Table 5 of this document summarizes the agency's estimates of costs for efficacy studies, PK studies, new dosage forms, and paperwork. Because the expense of pediatric trials and dosage form development will be spread over 2 or 3 years for any given drug, the total costs to industry in any given year are unlikely to vary as much as shown in Table 5. Most importantly, however, the average $80.1 million annual cost figure reflects only what the rule would have cost had the rule been in effect from 1993 to 1997. The incentives generated by the additional 6-month marketing exclusivity offered by FDAMA will reduce the future costs of the regulation.

TABLE 5.—ESTIMATED INDUSTRY COSTS—COMPLIANCE WITH PEDIATRIC LABELING

[in millions]

Year	Efficacy studies	PK studies	New dosage form developed	Paperwork	Total
1993	$15.3	19.7	22.3	1.4	58.6
1994	17.9	19.0	31.6	1.4	69.9
1995	16.7	17.3	24.1	1.4	59.5
1996	35.6	34.4	53.9	1.4	125.2
1997	25.7	24.7	35.3	1.4	87.0
Average Per Year	$22.2	$23.0	$33.4	$1.4	$80.0

FDA cannot develop precise adjustments for the forthcoming effects of FDAMA, due to the complexity of the economic forecasting that would be needed. Nevertheless, the agency developed rough projections of the potential impact of this statute by comparing the estimated present value of the 6-month exclusivity gain with the estimated cost of the new pediatric studies, for each of the 85 drugs with applications approved in 1993 and 1994 that would have needed new pediatric labeling. (More recent years were not used, because the revenues of newer drugs are far below their peak values.) Where the estimated exclusivity gain exceeded the cost of all required studies, including the development of new dosage forms, FDA concluded that the studies for that drug would have been initiated voluntarily and their cost attributable to FDAMA rather than to this regulation.

The methodology assumed that a 6-month gain of marketing exclusivity would be worth about 25 percent of a drug's annual sales revenue during the year the exclusivity is needed, less 60 percent for production, administrative, and marketing costs (Ref. 19). Costs of conducting the required studies for each of the 85 drugs were based on the cost estimates described previously ($150,000 for each efficacy study, $100,000 for each PK study, and $1 million for each new dosage form. The present value of the additional revenues (at a 7 percent discount rate) were calculated from 1997 sales data published by IMS America (Ref. 20). Because 1997 sales revenues probably underestimate the sales revenues that will be realized at the time that the added exclusivity is used, this methodology likely underestimates the effects of FDAMA, hence overestimating the costs of the rule. In general,

however, this analysis was insensitive to the precise assumptions used. For example, using an 11 percent rather than 7 percent discount rate raises the cost totals by only $1.2 million per year.

The analysis found that the necessary studies would have been conducted voluntarily for 56 out of the 85 affected applications (66 percent). Adjusting estimates of only the approved applications by this percentage (FDAMA was not assumed to affect studies for applications not obtaining approval), FDA projects that the annual costs attributable to this rule will be approximately $46.7 million, or about 42 percent below the non-FDAMA adjusted figure of $80 million.

Further, although the agency has not yet evaluated the full economic impact of the FDAMA legislation, it believes that the present value of the net revenues expected from the 6 months of added exclusivity granted under the new FDAMA legislation will greatly exceed the additional costs imposed by this regulation. One industry publication (MedAdNews, June 1998, p. 10) for example, reports that products currently valued at $41 billion in annual sales will come off patent between 1998 and 2008, or an average of $11 billion per year. Alternatively, FDA estimates that the annual revenues for NCE's coming off patent may average between $200 and $300 million each. If 25 NCE's lose exclusivity each year, these annual revenues would range from $5 billion to $7.5 billion. If only 60 percent of these NCE's become eligible for extended exclusivity, the methodology described above implies that industry net incomes will increase from $300 to $450 million per year. Thus, FDAMA and this rule, taken together, will provide critical pediatric information without diverting current resources from pharmaceutical innovation.

COM041COM041*E. Benefits*

The rule addresses two major problems associated with the lack of adequate information on the effects of drugs on pediatric patients: (1) Adverse drug reactions in children due to inadvertent drug overdoses or other drug administration problems that could be avoided with better information on appropriate pediatric use; and (2) under use of safe and effective drugs for children due to the prescribing of an inadequate dosage or regimen, a less effective drug, or no drug at all because of uncertainty over the drug's effect on children or the unavailability of a pediatric formulation. By developing improved information on whether, and in what dosage, a drug is safe and effective for use in children, FDA believes that the regulation will result in fewer adverse drug reactions and fewer instances of less-than-optimal treatment of pediatric patients.

Despite numerous reports of children endangered by the absence of adequate drug labeling, FDA has found no systematic studies in the literature that evaluate the overall magnitude of the harm that results from the incomplete labeling of drugs for use in children. In the preamble to the proposal, the agency specifically requested, ''information on any available studies or data related to the incidence and costs of either undertreatment or avoidable ADE's in pediatric age groups due to the lack of information on the effects of pharmaceuticals.'' The comments received cited case after case of children who have died or suffered because of the inadequate testing of drugs in children, but the information was largely anecdotal and related to particular instances of drug misuse or underuse.

For example, physicians who care for HIV-infected patients expressed frustration at their inability to treat children with drugs known to be effective in adults. Pulmonary specialists described the dearth of information on risks versus benefits of new antimicrobials for pediatric patients, citing the example of ciprofloxacin, a quinolone that may be valuable in treating cystic fibrosis, although the safety and effectiveness of the drug in children has not been established. Comments received from asthma specialists reaffirmed the difficulties of administering medications, treating drug side effects, or withholding treatment for children with asthma, due to the lack of research on drug safety and effectiveness.

In both written comments and in commentary at the public hearing in October 1997, concerns were raised about the costs of not implementing a requirement for pediatric labeling. Avoidable adverse outcomes, cited in relation to pediatric dosage problems, included opportunistic infections from too much immunosuppression, and loss of grafts in pediatric renal transplant patients with too little immunosuppression. Comments also cited added health care, including increased hospitalizations, required as a result of less effective treatment for pediatric patients. One comment estimated the cost of delayed access in terms of infant deaths, attributing an additional 2,000 unnecessary infant deaths over a 2-year period to the delay in access to AZT for HIV-exposed infants. Another suggested using the Vaccine Injury Compensation program figure of $250,000 per child as the value of an avoided death resulting from an ADR. Other comments confirmed that many adverse outcomes develop quickly and would be detected in early clinical studies (e.g., ''gray syndrome'' in babies treated with chloramphenicol).

While clearly demonstrating the critical need for improved pediatric information, these comments do not suggest a practical methodology for quantifying the aggregate benefits of this rule. FDA, also, has been unable to develop a precise assessment of the probable regulatory benefits. The agency's approach to estimating regulatory benefits therefore is framed in terms of the following two questions: (1) Are data available to assess current differences in the *safety* of drug therapy for adults versus children with the same condition? and (2) Are data available to assess current differences in the *effectiveness* of drug therapy for adults versus children with the same condition?

FDA first attempted to assess the *safety* of drug therapy by looking for differences in the frequency and severity of ADR's for adults versus children treated for the same condition. The available clinical and health survey data, however, did not provide a reliable estimate of the contribution of ADR's to pediatric as compared to adult rates of mortality and morbidity. ADR-related data are limited by the lack of a general requirement and a ready mechanism for the comprehensive reporting of incidents directly attributable to ADR's (Ref. 21). Moreover, most available studies have not addressed ADR rates and associated death rates by age group within a treated condition (Refs. 22, 23, and 24). For example, one study of pediatric patients shows an ADR-related admission rate in the range of only 2.0 to 3.2 percent, well below the average for adult and pediatric studies combined. Pediatric cancer patients, however, experienced a 22 percent ADR-admission rate (Ref. 25), suggesting that pediatric risks may be significantly greater within condition-defined subpopulations. In addition, potential concerns about negative public attention (Ref. 26) or liability inhibit reporting of ADR's. Finally, for many seriously ill patients, it is very difficult to attribute a specific medical outcome to a particular medication, as opposed to some other complication in the patient's condition, or misadventure in the patient's care. The agency found therefore that it could not rely on available ADR studies to derive an assessment of the potential benefits of this rule.

Data to assess the *effectiveness* of drug therapy would indicate differences in clinical outcomes, or in other health care utilization concomitant with drug therapy. If drug therapies for children were less effective than that for adults with the same condition, one might see longer recovery times, or lower recovery rates, together with increased health services use, assuming a similar prognosis and course of illness. A limitation to this approach is that the prognosis and course of illness may not be the same in children and adults with the same serious health condition, even if the same drugs were included in best-practice treatment. Moreover, differential patterns of health care utilization may reflect variations in physician practice patterns, insurance benefits, or patient and family behavior and preferences, rather than measures of drug effectiveness. Notwithstanding such limitations, comparisons of health care resource use for one therapeutic approach compared to another are commonly used in evaluations of therapy effectiveness in the field of pharmacoeconomics. In this instance, FDA finds that health care utilization data may provide at least an indirect indication of potential benefits. Hospitalization rates, in particular, are the most extensively studied measure of morbidity related to adverse drug reactions and of quality of care for a number of chronic (e.g., asthma) and acute conditions (e.g., pneumonia) (Refs. 27 and 28). While hospitalizations due to adverse drug reactions or drug therapy undertreatment are not always recognized, these admissions are routinely classified with a primary diagnosis of the underlying disease. FDA therefore has relied on diagnosis-related hospitalization rates to develop an order-of-magnitude assessment of the potential benefits of this rule.

For this assessment, the agency compared rates of hospitalization of pediatric patients to rates of hospitalization of adult patients for several important disease conditions. Next, the agency examined the potential direct and indirect cost savings that would be realized by diminishing any age-related disparities. The pediatric population was defined to be all persons under the age of 15 and the comparison group to be those adults between the ages of 15 and 44. (The exclusion of older adult patients minimizes the confounding effect of the age-related increased morbidity and mortality.) Comparisons were limited to asthma, HIV/AIDS, cancer, pneumonia, and kidney infection, as these conditions are life threatening, occur in both adults and children, and comparable data are available for adult and pediatric patients. Moreover, reports received in the FDA Spontaneous Reporting System (SRS) in 1993 indicated that the therapeutic areas for which the highest number of ADR's were reported for patients under age 15, relative to the number reported for patients 15 to 44, included those for anti-infectives, pulmonary drugs and oncology drugs.

Direct costs were based on the estimated number of cases, hospitalization rates, and length of stay for each of the selected conditions. The number of cases reported were based on national health survey (Ref. 29) and public surveillance data (Refs. 30, 31, and 32). In 1994, the total number of cases for these 5 conditions, in patients under age 15, was approximately 6.65 million. The total number of cases for patients ages 15 to 44 was approximately 8.3 million. The number of hospitalizations per year for which the selected condition was the primary diagnosis was obtained from the National Hospital Discharge Survey (Ref. 33). As shown in Table 6 of this document, the pediatric hospitalization rate exceeded the adult rate for all five conditions.

TABLE 6.—HOSPITALIZATION RATES PER PATIENT PER YEAR

Primary diagnosis	Rate under age 15	Rate for ages 15–44
Asthma	.045	.024
HIV/AIDS	.533	.233
Cancer	4.247	3.903
Pneumonia	.147	.129
Kidney Infection	.191	.073

The average length of hospital stay (ALOS) for patients with the selected condition as the primary diagnosis (based on ICD–9 code) was obtained from recent hospital survey data (Ref. 34), the average cost per day of inpatient hospital care for each of the selected conditions was based on hospital charge data reported in the survey (Ref. 35), and the cost of physician services associated with each episode of hospitalization was based on physician charge data (Ref. 36). Each episode of care was assumed to include physician charges for emergency room service, daily inpatient visits, and a postdischarge office visit. For cancer hospitalizations, daily inpatient visits and a followup office visit were included. The calculation of indirect costs assumed 8 hours of parental time away from work for each episode of hospitalization and income and productivity losses based on average employee compensation, as reported in the 1997 U.S. Statistical Abstract. A detailed description of all assumptions, calculations, and data sources is included in the full agency report (Ref. 37).

The assumed hypothesis is that a substantial fraction of the difference between pediatric and adult hospitalization rates for like disease conditions are attributable to the greater range of drug therapies and better information on drug dosages for adults. FDA cannot estimate the precise magnitude of the relevant fraction. Nevertheless, if the differentials between pediatric and adult hospitalization rates were reduced by 25 percent, the resulting direct cost savings would be $228 million, with indirect cost savings of $5.3 million per year. If the differentials were reduced by as much as 50 percent, the direct cost savings would be $456 million per year, with indirect savings of $10.6 million. Even if the differentials were as low as 10 percent, the resulting reductions in hospitalization would lead to direct cost savings of $91.2 million, with indirect savings of $2.1 million per year.

The timing of the benefit after the rule's implementation is uncertain. The previous values represent the potential benefit over time as the safety and effectiveness of drugs are more extensively tested, new and already marketed drugs become labeled for use in children, and new formulations and dosage forms are developed to facilitate therapy for children. The figures may overestimate the impact for the selected conditions over the next few years, but may underestimate the potential benefits for these patients in the longer term if there is an increasing prevalence of asthma, cancer, and respiratory and other infectious diseases in the pediatric population. Thus, the lower reduction estimate may be more realistic in the near-term, with the higher reduction estimates offering a better indication of longer-term benefit.

As discussed previously, FDA believes that the new FDAMA statute will cause some of these pediatric studies to be conducted voluntarily. In its assessment of costs, the agency found that about two-thirds of the applications for approved drugs needing pediatric studies may be undertaken voluntarily due to the incentives established by FDAMA. Adjusting the previous medical cost savings by a similar ratio suggests that if all of the new pediatric studies achieved a 25 percent reduction in the pediatric/adult hospitalization differentials, the additional studies prompted by this rule would yield

annual savings of $76 million for just those five diseases. This estimate may represent a lower bound on the benefits to pediatric patients, however, because a number of other disease conditions are also common to children and adults, including such life-threatening conditions as hypertensive disease and renal disease. These pediatric populations also would experience significant benefits from increased safety and access to drug treatments currently available only to adult patients. Moreover, the analysis omits any quantification of benefits for reduced pain and suffering and reduced pediatric mortality. Thus, the full benefits of the rule could easily exceed $100 million per year. Therefore, in accordance with the SBREFA, the Administrator of the Office of Information and Regulatory Affairs of the Office of Management and Budget (the Administrator) has determined that this rule is likely to result in an annual effect on the economy of $100 million or more and thus is a major rule for the purpose of congressional review.

F. Small Entities

The rule will impose a burden on relatively few small entities, because new drug development is typically an activity completed by large multinational firms. Only one industry comment questioned the agency's determination that the rule would not have a significant effect on a substantial number of small entities. That comment indicated that about 1,500 small entities are conducting diagnostic and therapeutic R&D in the United States and that ''[c]ontributions to new drug approvals by the 'biotech' and 'small pharma' sector are increasing year by year, and the pace of change will—almost certainly—continue.''

FDA agrees that small firms contribute substantially to the early development of many new drugs and biologicals. Nevertheless, because of the considerable resources needed for clinical testing and marketing, the agency finds that very few of these small firms retain ownership and control through the large-scale clinical testing and approval stages. Moreover, many of the products that are sponsored by small companies are eligible for orphan designation and therefore exempted from this rule. To approximate the number of small firms that might be significantly affected, FDA determined the sponsor company size for all of the approved applications that may have required additional pediatric studies had this rule been in place over the years from 1993 to 1997. The agency found that, on average, based on the Small Business Administration's definition of a small firm, only three approved applications per year were submitted by small companies. Multiplying by the previously described 1.58 factor to account for unapproved applications increases this estimate of the number of small entities that may have been significantly affected by this rule to just five small firms per year. Because the agency has certified that the rule will not impose a significant economic impact on a substantial number of small entities, the Regulatory Flexibility Act does not require the agency to prepare a Regulatory Flexibility Analysis. Moreover, the agency further points out that the required new studies will comprise a very small part of the total cost of developing new drugs or biologics, which is generally estimated in the hundreds of millions of dollars for each new drug.

G. Regulatory Alternatives

The agency carefully examined two major alternatives to the final rule. The first alternative considered was the initial proposal, which covered only NCE's. The estimated cost of this alternative, excluding the FDAMA adjustment, would be about $40 million, or roughly 50 percent of the cost of the final rule. The agency rejected this alternative because of the predominant view of the medical community that additional pediatric data were needed for all of the drugs and biologicals that may be therapeutically significantly in pediatric populations, not just for the new chemical entities.

The other major alternative considered was to delay implementation of the rule until the effects of the new FDAMA statute were reviewed. FDA fully expects the FDAMA exclusivity provisions to provide a substantial incentive to conduct large numbers of pediatric studies. Nevertheless, the agency finds that relying on these incentives, alone, would leave numerous gaps in many important areas of pediatric labeling. For example, as described earlier in this preamble, voluntary research may overlook studies for many important drugs, especially where such studies require the development of new pediatric dosage forms. Thus, notwithstanding FDAMA incentives, FDA has determined that this regulation is necessary to protect the pediatric population and that further delay is not warranted.

IX. References

The following references have been placed on display in the Dockets Management Branch (HFA–305), Food and Drug Administration, 5630 Fishers Lane, rm. 1061, Rockville, MD 20852, and may be seen by interested persons between 9 a.m. and 4 p.m., Monday through Friday.

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List of Subjects

21 CFR Part 201

Drugs, Labeling, Reporting and recordkeeping requirements.

21 CFR Part 312

Drugs, Exports, Imports, Investigations, Labeling, Medical research, Reporting and recordkeeping requirements, Safety.

21 CFR Part 314

Administrative practice and procedure, Confidential business information, Drugs, Reporting and recordkeeping requirements.

21 CFR Part 601

Administrative practice and procedure, Biologics, Confidential business information.

Therefore, under the Federal Food, Drug, and Cosmetic Act, the Public Health Service Act, and under authority delegated to the Commissioner of Food and Drugs, 21 CFR parts 201, 312, 314, and 601 are amended as follows:

PART 201—LABELING

1. The authority citation for 21 CFR part 201 continues to read as follows:

Authority: 21 U.S.C. 321, 331, 351, 352, 353, 355, 357, 358, 360, 360b, 360gg-360ss, 371, 374, 379e; 42 U.S.C. 216, 241, 262, 264.

2. Section 201.23 is added to subpart A to read as follows:

§ 201.23 Required pediatric studies.

(a) A manufacturer of a marketed drug product, including a biological drug product, that is used in a substantial number of pediatric patients, or that provides a meaningful therapeutic benefit over existing treatments for pediatric patients, as defined in §§ 314.55(c)(5) and 601.27(c)(5) of this chapter, but whose label does not provide adequate information to support its safe and effective use in pediatric populations for the approved indications may be required to submit an application containing data adequate to assess whether the drug product is safe and effective in pediatric populations. The application may be required to contain adequate evidence to support dosage and administration in some or all pediatric subpopulations, including neonates, infants, children, and adolescents, depending upon the known or appropriate use of the drug product in such subpopulations. The applicant may also be required to develop a pediatric formulation for a drug product that represents a meaningful therapeutic benefit over existing therapies for pediatric populations for whom a pediatric formulation is necessary, unless the manufacturer demonstrates that reasonable attempts to produce a pediatric formulation have failed.

(b) The Food and Drug Administration (FDA) may by order, in the form of a letter, after notifying the manufacturer of its intent to require an assessment of pediatric safety and effectiveness of a pediatric formulation, and after offering an opportunity for a written response and a meeting, which may include an advisory committee meeting, require a manufacturer to submit an application containing the information or request for approval of a pediatric formulation described in paragraph (a) of this section within a time specified in the order, if FDA finds that:

(1) The drug product is used in a substantial number of pediatric patients for the labeled indications and the absence of adequate labeling could pose significant risks to pediatric patients; or

(2) There is reason to believe that the drug product would represent a meaningful therapeutic benefit over

existing treatments for pediatric patients for one or more of the claimed indications, and the absence of adequate labeling could pose significant risks to pediatric patients.

(c)(1) An applicant may request a full waiver of the requirements of paragraph (a) of this section if the applicant certifies that:

(i) Necessary studies are impossible or highly impractical because, e.g., the number of such patients is so small or geographically dispersed, or

(ii) There is evidence strongly suggesting that the product would be ineffective or unsafe in all pediatric age groups.

(2) An applicant may request a partial waiver of the requirements of paragraph (a) of this section with respect to a specified pediatric age group, if the applicant certifies that:

(i) The product:

(A) Does not represent a meaningful therapeutic benefit over existing therapies for pediatric patients in that age group, *and*

(B) Is not likely to be used in a substantial number of patients in that age group, *and*

(C) The absence of adequate labeling could not pose significant risks to pediatric patients; *or*

(ii) Necessary studies are impossible or highly impractical because, e.g., the number of patients in that age group is so small or geographically dispersed, or

(iii) There is evidence strongly suggesting that the product would be ineffective or unsafe in that age group, or

(iv) The applicant can demonstrate that reasonable attempts to produce a pediatric formulation necessary for that age group have failed.

(3) FDA shall grant a full or partial waiver, as appropriate, if the agency finds that there is a reasonable basis on which to conclude that one or more of the grounds for waiver specified in paragraphs (c)(2) or (c)(3) of this section have been met. If a waiver is granted on the ground that it is not possible to develop a pediatric formulation, the waiver will cover only those pediatric age groups requiring that formulation. If a waiver is granted because there is evidence that the product would be ineffective or unsafe in pediatric populations, this information will be included in the product's labeling.

(d) If a manufacturer fails to submit a supplemental application containing the information or request for approval of a pediatric formulation described in paragraph (a) of this section within the time specified by FDA, the drug product may be considered misbranded or an unapproved new drug or unlicensed biologic.

PART 312—INVESTIGATIONAL NEW DRUG APPLICATION

3. The authority citation for 21 CFR part 312 continues to read as follows:

Authority: 21 U.S.C. 321, 331, 351, 352, 353, 355, 357, 371; 42 U.S.C. 262.

4. Section 312.23 is amended by redesignating paragraph (a)(10)(iii) as paragraph (a)(10)(iv) and adding new paragraph (a)(10)(iii) to read as follows:

§ 312.23 IND content and format.

(a) * * *

(10) * * *

(iii) *Pediatric studies.* Plans for assessing pediatric safety and effectiveness.

* * * * *

5. Section 312.47 is amended by revising paragraph (b)(1)(i) and the first sentence of paragraph (b)(1)(iv), by removing the fifth sentence of paragraph (b)(1)(v) and adding two sentences in its place, by revising the heading of paragraph (b)(2) and the second and last sentences of the introductory text of paragraph (b)(2), and by redesignating paragraph (b)(2)(iii) as paragraph (b)(2)(iv) and by adding new paragraph (b)(2)(iii) to read as follows:

§ 312.47 Meetings.

* * * * *

(b) * * *

(1) *End-of-Phase 2 meetings*—(i) *Purpose.* The purpose of an end-of-phase 2 meeting is to determine the safety of proceeding to Phase 3, to evaluate the Phase 3 plan and protocols and the adequacy of current studies and plans to assess pediatric safety and effectiveness, and to identify any additional information necessary to support a marketing application for the uses under investigation.

* * * * *

(iv) *Advance information.* At least 1 month in advance of an end-of-Phase 2 meeting, the sponsor should submit background information on the sponsor's plan for Phase 3, including summaries of the Phase 1 and 2 investigations, the specific protocols for Phase 3 clinical studies, plans for any additional nonclinical studies, plans for pediatric studies, including a time line for protocol finalization, enrollment, completion, and data analysis, or information to support any planned request for waiver or deferral of pediatric studies, and, if available, tentative labeling for the drug. * * *

(v) *Conduct of meeting.* * * * The adequacy of the technical information to support Phase 3 studies and/or a marketing application may also be discussed. FDA will also provide its best judgment, at that time, of the pediatric studies that will be required for the drug product and whether their submission will be deferred until after approval. * * *

(2) *''Pre-NDA'' and ''pre-BLA'' meetings.* * * * The primary purpose of this kind of exchange is to uncover any major unresolved problems, to identify those studies that the sponsor is relying on as adequate and well-controlled to establish the drug's effectiveness, to identify the status of ongoing or needed studies adequate to assess pediatric safety and effectiveness, to acquaint FDA reviewers with the general information to be submitted in the marketing application (including technical information), to discuss appropriate methods for statistical analysis of the data, and to discuss the best approach to the presentation and formatting of data in the marketing application. * * * To permit FDA to provide the sponsor with the most useful advice on preparing a marketing application, the sponsor should submit to FDA's reviewing division at least 1 month in advance of the meeting the following information:

* * * * *

(iii) Information on the status of needed or ongoing pediatric studies.

* * * * *

6. Section 312.82 is amended by revising the last sentence of paragraph (a) and by removing the second sentence of paragraph (b) and adding two sentences in its place to read as follows:

§ 312.82 Early consultation.

* * * * *

(a) *Pre-investigational new drug (IND) meetings.* * * * The meeting may also provide an opportunity for discussing the scope and design of phase 1 testing, plans for studying the drug product in pediatric populations, and the best approach for presentation and formatting of data in the IND.

(b) *End-of-phase 1 meetings.* * * * The primary purpose of this meeting is to review and reach agreement on the design of phase 2 controlled clinical trials, with the goal that such testing will be adequate to provide sufficient data on the drug's safety and effectiveness to support a decision on its approvability for marketing, and to discuss the need for, as well as the design and timing of, studies of the drug in pediatric patients. For drugs for life-threatening diseases, FDA will provide its best judgment, at that time, whether pediatric studies will be required and whether their submission will be deferred until after approval. * * *

PART 314—APPLICATIONS FOR FDA APPROVAL TO MARKET A NEW DRUG OR AN ANTIBIOTIC DRUG

7. The authority citation for 21 CFR part 314 continues to read as follows:

Authority: 21 U.S.C. 321, 331, 351, 352, 353, 355, 357, 371, 374, 379e.

8. Section 314.50 is amended by adding paragraph (d)(7) to read as follows:

§ 314.50 Content and format of an application.

* * * * *

(d) * * *

(7) *Pediatric use section.* A section describing the investigation of the drug for use in pediatric populations, including an integrated summary of the information (the clinical pharmacology studies, controlled clinical studies, or uncontrolled clinical studies, or other data or information) that is relevant to the safety and effectiveness and benefits and risks of the drug in pediatric populations for the claimed indications, a reference to the full descriptions of such studies provided under paragraphs (d)(3) and (d)(5) of this section, and information required to be submitted under § 314.55.

* * * * *

9. Section 314.55 is added to subpart B to read as follows:

§ 314.55 Pediatric use information.

(a) *Required assessment.* Except as provided in paragraphs (b), (c), and (d) of this section, each application for a new active ingredient, new indication, new dosage form, new dosing regimen, or new route of administration shall contain data that are adequate to assess the safety and effectiveness of the drug product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. Where the course of the disease and the effects of the drug are sufficiently similar in adults and pediatric patients, FDA may conclude that pediatric effectiveness can be extrapolated from adequate and well-controlled studies in adults usually supplemented with other information obtained in pediatric patients, such as pharmacokinetic studies. Studies may not be needed in each pediatric age group, if data from one age group can be extrapolated to another. Assessments of safety and effectiveness required under this section for a drug product that represents a meaningful therapeutic benefit over existing treatments for pediatric patients must be carried out using appropriate formulations for each age group(s) for which the assessment is required.

(b) *Deferred submission.* (1) FDA may, on its own initiative or at the request of an applicant, defer submission of some or all assessments of safety and effectiveness described in paragraph (a) of this section until after approval of the drug product for use in adults. Deferral may be granted if, among other reasons, the drug is ready for approval in adults before studies in pediatric patients are complete, or pediatric studies should be delayed until additional safety or effectiveness data have been collected. If an applicant requests deferred submission, the request must provide a certification from the applicant of the grounds for delaying pediatric studies, a description of the planned or ongoing studies, and evidence that the studies are being or will be conducted with due diligence and at the earliest possible time.

(2) If FDA determines that there is an adequate justification for temporarily delaying the submission of assessments of pediatric safety and effectiveness, the drug product may be approved for use in adults subject to the requirement that the applicant submit the required assessments within a specified time.

(c) *Waivers*—(1) *General.* FDA may grant a full or partial waiver of the requirements of paragraph (a) of this section on its own initiative or at the request of an applicant. A request for a waiver must provide an adequate justification.

(2) *Full waiver.* An applicant may request a waiver of the requirements of paragraph (a) of this section if the applicant certifies that:

(i) The drug product does not represent a meaningful therapeutic benefit over existing treatments for pediatric patients and is not likely to be used in a substantial number of pediatric patients;

(ii) Necessary studies are impossible or highly impractical because, e.g., the number of such patients is so small or geographically dispersed; or

(iii) There is evidence strongly suggesting that the drug product would be ineffective or unsafe in all pediatric age groups.

(3) *Partial waiver.* An applicant may request a waiver of the requirements of paragraph (a) of this section with respect to a specified pediatric age group, if the applicant certifies that:

(i) The drug product does not represent a meaningful therapeutic benefit over existing treatments for pediatric patients in that age group, and is not likely to be used in a substantial number of patients in that age group;

(ii) Necessary studies are impossible or highly impractical because, e.g., the number of patients in that age group is so small or geographically dispersed;

(iii) There is evidence strongly suggesting that the drug product would be ineffective or unsafe in that age group; or

(iv) The applicant can demonstrate that reasonable attempts to produce a pediatric formulation necessary for that age group have failed.

(4) *FDA action on waiver.* FDA shall grant a full or partial waiver, as appropriate, if the agency finds that there is a reasonable basis on which to conclude that one or more of the grounds for waiver specified in paragraphs (c)(2) or (c)(3) of this section have been met. If a waiver is granted on the ground that it is not possible to develop a pediatric formulation, the waiver will cover only those pediatric age groups requiring that formulation. If a waiver is granted because there is evidence that the product would be ineffective or unsafe in pediatric populations, this information will be included in the product's labeling.

(5) *Definition of ''meaningful therapeutic benefit''.* For purposes of this section and § 201.23 of this chapter, a drug will be considered to offer a meaningful therapeutic benefit over existing therapies if FDA estimates that:

(i) If approved, the drug would represent a significant improvement in the treatment, diagnosis, or prevention of a disease, compared to marketed products adequately labeled for that use in the relevant pediatric population. Examples of how improvement might be demonstrated include, for example, evidence of increased effectiveness in treatment, prevention, or diagnosis of disease, elimination or substantial reduction of a treatment-limiting drug reaction, documented enhancement of compliance, or evidence of safety and effectiveness in a new subpopulation; or

(ii) The drug is in a class of drugs or for an indication for which there is a need for additional therapeutic options.

(d) *Exemption for orphan drugs.* This section does not apply to any drug for an indication or indications for which orphan designation has been granted under part 316, subpart C, of this chapter.

10. Section 314.81 is amended by revising paragraph (b)(2)(i) and (b)(2)(vii), and by adding paragraph (b)(2)(vi)(*c*) to read as follows:

§ 314.81 Other postmarketing reports.

* * * * *

(b) * * *

(2) * * *

(i) *Summary.* A brief summary of significant new information from the previous year that might affect the safety, effectiveness, or labeling of the drug product. The report is also required to contain a brief description of actions the applicant has taken or intends to take as a result of this new information, for example, submit a labeling supplement, add a warning to the labeling, or initiate a new study. The summary shall briefly state whether labeling supplements for pediatric use have been submitted and whether new studies in the pediatric population to support appropriate labeling for the pediatric population have been initiated. Where possible, an estimate of patient exposure to the drug product, with special reference to the pediatric population (neonates, infants, children, and adolescents) shall be provided, including dosage form.

* * * * *

(vi) * * *

(*c*) Analysis of available safety and efficacy data in the pediatric population and changes proposed in the labeling based on this information. An assessment of data needed to ensure appropriate labeling for the pediatric population shall be included.

(vii) *Status reports.* A statement on the current status of any postmarketing studies performed by, or on behalf of, the applicant. The statement shall include whether postmarketing clinical studies in pediatric populations were required or agreed to, and if so, the status of these studies, e.g., to be initiated, ongoing (with projected completion date), completed (including date), completed and results submitted to the NDA (including date). To facilitate communications between FDA and the applicant, the report may, at the applicant's discretion, also contain a list of any open regulatory business with FDA concerning the drug product subject to the application.

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PART 601—LICENSING

11. The authority citation for 21 CFR part 601 is revised to read as follows:

Authority: 15 U.S.C. 1451–1461; 21 U.S.C. 321, 351, 352, 353, 355, 360, 360c-360f, 360h-360j, 371, 374, 379e, 381; 42 U.S.C. 216, 241, 262, 263.

12. Section 601.27 is added to subpart C to read as follows:

§ 601.27 Pediatric studies.

(a) *Required assessment.* Except as provided in paragraphs (b), (c), and (d) of this section, each application for a new active ingredient, new indication, new dosage form, new dosing regimen, or new route of administration shall contain data that are adequate to assess the safety and effectiveness of the product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. Where the course of the disease and the effects of the product are similar in adults and pediatric patients, FDA may conclude that pediatric effectiveness can be extrapolated from adequate and well-controlled effectiveness studies in adults, usually supplemented with other information in pediatric patients, such as pharmacokinetic studies. In addition, studies may not be needed in each pediatric age group, if data from one age group can be extrapolated to another. Assessments required under this section for a product that represents a meaningful therapeutic benefit over existing treatments must be carried out using appropriate formulations for the age group(s) for which the assessment is required.

(b) *Deferred submission.* (1) FDA may, on its own initiative or at the request of an applicant, defer submission of some or all assessments of safety and effectiveness described in paragraph (a) of this section until after licensing of the product for use in adults. Deferral may be granted if, among other reasons, the product is ready for approval in adults before studies in pediatric patients are complete, pediatric studies should be delayed until additional safety or effectiveness data have been collected. If an applicant requests deferred submission, the request must provide an adequate justification for delaying pediatric studies, a description of the planned or ongoing studies, and evidence that the studies are being or will be conducted with due diligence and at the earliest possible time.

(2) If FDA determines that there is an adequate justification for temporarily delaying the submission of assessments of pediatric safety and effectiveness, the product may be licensed for use in adults subject to the requirement that the applicant submit the required assessments within a specified time.

(c) *Waivers*—(1) *General.* FDA may grant a full or partial waiver of the requirements of paragraph (a) of this section on its own initiative or at the request of an applicant. A request for a waiver must provide an adequate justification.

(2) *Full waiver.* An applicant may request a waiver of the requirements of paragraph (a) of this section if the applicant certifies that:

(i) The product does not represent a meaningful therapeutic benefit over existing therapies for pediatric patients and is not likely to be used in a substantial number of pediatric patients;

(ii) Necessary studies are impossible or highly impractical because, e.g., the number of such patients is so small or geographically dispersed; or

(iii) There is evidence strongly suggesting that the product would be ineffective or unsafe in all pediatric age groups.

(3) *Partial waiver.* An applicant may request a waiver of the requirements of paragraph (a) of this section with respect to a specified pediatric age group, if the applicant certifies that:

(i) The product does not represent a meaningful therapeutic benefit over existing therapies for pediatric patients in that age group, and is not likely to be used in a substantial number of patients in that age group;

(ii) Necessary studies are impossible or highly impractical because, e.g., the number of patients in that age group is so small or geographically dispersed;

(iii) There is evidence strongly suggesting that the product would be ineffective or unsafe in that age group; or

(iv) The applicant can demonstrate that reasonable attempts to produce a pediatric formulation necessary for that age group have failed.

(4) *FDA action on waiver.* FDA shall grant a full or partial waiver, as appropriate, if the agency finds that there is a reasonable basis on which to conclude that one or more of the grounds for waiver specified in paragraphs (c)(2) or (c)(3) of this section have been met. If a waiver is granted on the ground that it is not possible to develop a pediatric formulation, the waiver will cover only those pediatric age groups requiring that formulation. If a waiver is granted because there is evidence that the product would be ineffective or unsafe in pediatric populations, this information will be included in the product's labeling.

(5) *Definition of ''meaningful therapeutic benefit''.* For purposes of this section, a product will be considered to offer a meaningful therapeutic benefit over existing therapies if FDA estimates that:

(i) If approved, the product would represent a significant improvement in the treatment, diagnosis, or prevention of a disease, compared to marketed products adequately labeled for that use in the relevant pediatric population. Examples of how improvement might be demonstrated include, e.g., evidence of increased effectiveness in treatment, prevention, or diagnosis of disease;

elimination or substantial reduction of a treatment-limiting drug reaction; documented enhancement of compliance; or evidence of safety and effectiveness in a new subpopulation; or

(ii) The product is in a class of products or for an indication for which there is a need for additional therapeutic options.

(d) *Exemption for orphan drugs.* This section does not apply to any product for an indication or indications for which orphan designation has been granted under part 316, subpart C, of this chapter.

13. Section 601.37 is added to subpart D to read as follows:

§ 601.37 Annual reports of postmarketing pediatric studies.

Sponsors of licensed biological products shall submit the following information each year within 60 days of the anniversary date of approval of the license, to the Director, Center for Biologics Evaluation and Research:

(a) *Summary.* A brief summary stating whether labeling supplements for pediatric use have been submitted and whether new studies in the pediatric population to support appropriate labeling for the pediatric population have been initiated. Where possible, an estimate of patient exposure to the drug product, with special reference to the pediatric population (neonates, infants, children, and adolescents) shall be provided, including dosage form.

(b) *Clinical data.* Analysis of available safety and efficacy data in the pediatric population and changes proposed in the labeling based on this information. An assessment of data needed to ensure appropriate labeling for the pediatric population shall be included.

(c) *Status reports.* A statement on the current status of any postmarketing studies in the pediatric population performed by, or on behalf of, the applicant. The statement shall include whether postmarketing clinical studies in pediatric populations were required or agreed to, and if so, the status of these studies, e.g., to be initiated, ongoing (with projected completion date), completed (including date), completed and results submitted to the BLA (including date).

Dated: November 24, 1998.

Michael A. Friedman,

Acting Commissioner of Food and Drugs.

Donna E. Shalala,

Secretary of Health and Human Services.

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